A study of perinatal services among maternity users in a southern district in Nepal

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In partial fulfilment of the requirements of Bournemouth University

for the degree of Doctor of Philosophy

Bournemouth University, U.K.

June 2019

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Introduction

A birthing centre (BC) is a component of maternal health service delivery at local level and provides a midwifery led model of care in a community or hospital setting to healthy women with uncomplicated or low risk pregnancies. In Nepal, Auxiliary Nurse Midwives (ANMs) provide much of the primary care maternity services delivering care especially at BCs. Literature suggests, BCs in Nepal are often bypassed in order to utilise services available at hospitals. There is a need for study which focuses on the role of BCs in providing good quality maternity and childbirth services. This study evaluated the effects of an intervention consisting of supporting BCs and community-based health promotion programme on increasing access and utilisation of perinatal care facilities in community setting.

Methods

A longitudinal (cross-sectional) study was undertaken using a mixed methods approach. The quantitative methods consisted of two surveys that were conducted in rural area of a district in Nepal in the year 2012 and 2017 respectively. The qualitative method consisted of interviews and focus group discussion. Survey data were analysed in SPSS and interviews in NVivo. Descriptive analysis along with chi square test for association, Cramer's V for strength of association and multinomial logistic regression were conducted for quantitative survey whereas qualitative data were analysed thematically.

Results

The results of quantitative data showed that there was increase in utilisation of perinatal services available from BCs. There was also change in place of childbirth from home to health facilities, mostly the BCs. The results of multinomial logistic regression showed women were significantly more likely to give birth at health facilities, mostly primary care facilities compared to home if decision maker for place of birth were husbands, women and family members; and if women had four or more antenatal care (ANC) visits. Similarly, women were less likely to give birth at primary care facilities if they had only primary level of education.

Bearing in mind the small scale of this qualitative component of study, it showed the participants were happy and satisfied with the quality of services and attitude and behaviour of ANMs at the BCs. However, the need for increasing health promotion and awareness among women, need for improving referral services and training needs for health promoters were identified.

Conclusion

The main conclusion of this thesis on maternity and childbirth care in Southern Nepal is that trained health promoters have potential to increase the births at BCs and decrease home births. The role of health promoters and female community health volunteers are important in rural Nepal, but the socio-economic factors including women's education, occupation of husbands and decision-making capability of women also affects the access to and utilisation of perinatal services at the health facility, especially the BCs. The importance of four ANC visits cannot be overlooked in understanding the uptake of birth at BCs. Moreover, further training of health promoters along with availability of referral services needs to be ensured.

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Acknowledgements

I would like to thank my notable supervisors, Professor Edwin van Teijlingen, Professor Padam Simkhada and Dr Catherine Angell who helped me with their extensive knowledge, expertise, and guidance throughout my Ph.D. I am really indebted to them for offering the best kind of supervision by their unending support, words of encouragement at trying times and patience when things went unexpected. Submission of this thesis was possible only after their help in data collection, analysis and interpretation, comments on several drafts and approving the final draft.

I would also want to extend my sincere thanks to institutions who supported me in my Ph.D., the Faculty of Health and Social Sciences, Bournemouth University (BU), UK; Green Tara Nepal; Open Society Foundation and Santander Awards. These institutions helped in several ways – from supporting my academic performance to providing opportunities to present my research findings in international arena. Thanks to all the research participants including community women and auxiliary nurse midwives, data enumerators, as well as staff of Green Tara Nepal for all the help and support during data collection phase.

I am grateful to Dr Zoe Sheppard, Professor Peter Thomas and Mr Steve Smith for helping me with data analysis and interpretation. My sincere thanks to FHSS Research especially Louise Bryant and Doctoral College for helping me with my academic and practical needs.

Thanks to all my family members including my parents, in-laws, brothers and all friends especially Sristi and Dominique who helped me with proof-reading, supported and encouraged me throughout my studies. My acknowledgement would be incomplete without thanking my dear husband who not only encouraged me to pursue this study but also stood by me at times of need. Last but not the least, thank you my dearest daughter Eshani for coming to my life during this study and being a motivation to complete it no matter how challenging it was.

I want to dedicate this work to God and my spiritual masters (Gurus), the greatest power and giver of everything in my life.

Declaration

I declare that I conducted the work represented in this thesis entitled *A study of perinatal services among maternity users in a southern district in Nepal*. It is in accordance with the requirement for the degree of Ph.D. at Bournemouth University. I have presented this work to the best of my knowledge and is original except as acknowledged in the script. All the quotations mentioned has been distinguished by quotation marks and sources of information have been acknowledged. Finally, I declare that this thesis has not been submitted previously, either as a whole or in part, for a degree at this or any other university.

Preeti K. Mahato

4 June 2019

List of Abbreviations

ANC	Antenatal Care
ANM	Auxiliary Nurse Midwives
BC	Birthing Centre
BP/CR	Birth Preparedness/Complication Readiness
BEmONC	Basic Emergency Obstetric and Neonatal Care
CEmONC	Comprehensive Emergency Obstetric and Neonatal Care
CI	Confidence Interval
CS	Caesarean Section
DAG	Disadvantage Group
DHO	District Health Office
DPHO	District Public Health Office
EOC	Essential Obstetric Care
EmONC	Emergency Obstetric and Neonatal Care
EMPP	Ending Preventable Maternal Mortality
FCHV	Female Community Health Volunteer
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GoN	Government of Nepal
GTN	Green Tara Nepal
HCW	Health Care Worker
HP	Health Post
ICU	Intensive Care Unit
LMIC	Low and Middle-Income Countries
MDG	Millennium Development Goals
MMR	Maternal Mortality Ratio
NDHS	Nepal Demographic and Health Survey
NGO	Non-Governmental Organisation
PHC	Primary Health Care
PHCC	Primary Health Care Centre
Ph.D.	Doctor of Philosophy
PNC	Postnatal Care
RCM	Respectful Maternity Care
RCT	Randomised Controlled Trial
SBA	Skilled Birth Attendant
SDG	Sustainable Development Goal
SHP	Sub-Health Post
SPSS	Statistical Package for Social Sciences
TLTL	Too Little Too Late
TT	Tetanus Toxiod
TMTS	Too Much Too Soon
UHC	Universal Health Coverage
UN	United Nations
USD	United States Dollar
VDC	Village Development Committee
WHO	World Health Organization
WC	Women in the Community

CHAPTER 1 Introduction

1.1 Background

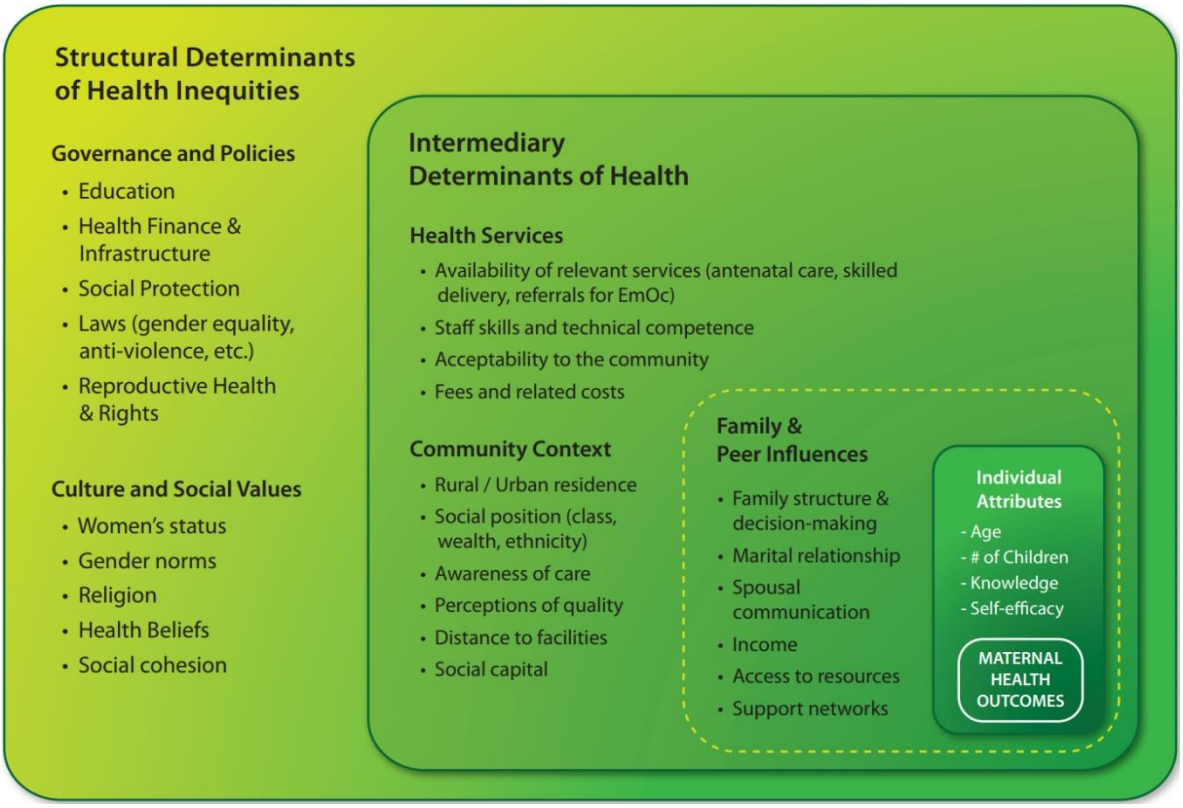
Maternal mortality is one of the major risks to women and families in low-income countries (Ronsmans and Graham 2006; Hogan et al. 2010; Zureick-Brown et al. 2013) and a key indicator of international development (Zureick-Brown et al. 2013). Although the global maternal mortality ratio (MMR) fell by nearly 44% from 1990 to 2015, the estimates show almost 99% (302,000) of global maternal deaths in 2015 occurred in low- and middle-income countries (LMICs), the majority (66%) in sub-Saharan Africa (201,000) followed by Southern Asia (62,000) (WHO 2015a). The Safe Motherhood conference in Nairobi in 1987 emphasised the importance of reducing maternal mortality, with one of its goals being provision of antenatal care and skilled assistance at birth (Mahler 1987) in a safe and conducive environment with essential obstetric facilities available at all levels of district health system (including community level to district hospital) (Freedman et al. 2004).

Proven interventions include improved nutrition, improved hygienic practices, skilled birth attendance, antenatal care (ANC), emergency obstetric and newborn care, and post-natal visits provided through a continuum of care linking households and communities with health systems; these could all prevent thousands of maternal and neonatal deaths globally (UNICEF 2008). It has been estimated that the presence of skilled birth attendants (SBAs) could avert between 16% and 33% of maternal deaths (Graham et al. 2001). Obstetrics can be basic, and such a role would include normal birth along with newborn care and care for the stabilisation of women with obstetric complications before referral to a higher level of care, or emergency obstetric and neonatal care (EmONC), comprising elements of care needed for the management of complications arising during pregnancy, birth and the

postpartum period (Carlough and McCall 2005). Although there are many deaths that are caused by complications of pregnancy (WHO and UNICEF 2012), timely referral to EmONC and prompt treatment could save the lives of both mother and the child (WHO 2009). However, there is evidence that the global need for emergency obstetric care has only been met by 45% and a significant disparity exists between LMICs, with need only being met by 21% and 32% respectively (Holmer et al. 2015). Evidence also shows that the majority of women in low income countries, including Nepal, still continue to give birth at home or in community settings without SBAs and in the absence of facility-based services that give access to EmONC, should a complication arise (Carlough and McCall 2005; UNICEF 2008; Montagu et al. 2011).

The Alma-Ata Declaration in 1978, to which Nepal is a signatory, focused on the need to expand health care beyond medical interventions to address the social, cultural and infrastructural constraints on providing quality health services to its citizens (WHO 1978). Social, cultural and other factors associated with maternal health outcomes have received wider attention. Maternal outcomes are found to be influenced and shaped by many factors, including: family and peer influences; the community context; health services; legal and policy environments; cultural and social values (United Nations Development Programme 2011) as shown in Figure 1. A recent systematic review on social autopsy done to understand maternal, newborn and child mortality in low-resource settings showed that cost, distance and transportation, despite common barriers, are not the only obstacles to pregnant women and children receiving life-saving care (Moyer et al. 2017). The reviewers also emphasized the need to understand these barriers better and address them through locally appropriate means.

Figure 1: Social, cultural and other determinants of maternal health



(Source: United Nations Development Programme, 2011)

The comprehensive primary health care (PHC) approach stresses the importance of having a supportive environment, along with preventive and curative interventions, to improve health outcomes. Although demise of PHC has occurred according to Hall and Taylor (2003), this approach is pertinent even today as the inequity in health care provision in low-income countries is widening (UNICEF 2008). Primary health care centres (PHCC) can provide essential services for mothers, neonates and children through integrated packages based round facilities, outpatient and outreach, and community and family care (WHO 2005; Kerber et al. 2007; UNICEF 2008). In order to be effective, a continuum of care would need to be available wherever required and linked to other levels of care where needed (Kerber et al. 2007). Thus, the PHCC intrapartum-care strategy has been proposed as the best bet to

bring down the MMR (Campbell and Graham 2006). This strategy is provided at a PHCC which provides essential obstetric care (EOC), with prompt recognition and referral to EmONC services for complications. This strategy of intrapartum care is considered adequate for most births and fits well with Nepal's district health systems (Campbell and Graham 2006).

1.2 State of maternal mortality in South Asia and Nepal

Measuring maternal mortality is a challenge owing to the fact that less than 40% of the countries have a complete civil registration system with good attribution of cause of death, which is necessary for accurate measurement of maternal mortality (WHO 2014b). In the absence of complete and accurate civil registration systems, MMR estimates are calculated. The calculations are based on data from a variety of sources including censuses, household surveys, reproductive-age mortality studies and verbal autopsies (WHO 2014b). Data show that South Asia significantly reduced its MMR from 550 per 100,000 live births in 1990 to 190 per 100,000 live births in 2013. Marking a decline of 65% equivalent to 4.4% per annum, this is the largest reduction in MMR achieved amongst the six world regions. Bhutan, Maldives and Nepal are amongst 10 countries worldwide to have reduced maternal deaths by 75% or more (WHO 2014b; El-Saharty and Ohno 2015).

WHO estimated the MMR of Nepal to be 258 in 2015, which substantially declined from 364 per 100,000 live births in 1996 as estimated by the Nepal Family Health Survey and 901 per 100,000 live births in 1990 (WHO 2015a). Improved uptake of maternity care services seems essential to this rapid decline in MMR which can also be explained by improved levels of education (Shrestha et al. 2014). A recent nationwide survey, the Nepal Demographic and Health Survey (NDHS) conducted in 2016 found the MMR to be 239 per

100,000 live births during the 7 years (2009-2016) preceding the survey. This survey reported the direct estimates of maternal mortality and not the indirect sisterhood method of estimating maternal mortality (Ministry of Health et al. 2017). Eighty-four percent of women who gave birth within 5 years before the survey received ANC from a skilled provider i.e. SBA compared to 69% in 2011 NDHS survey. Similarly, 58% of deliveries were conducted by a SBA and 57% of births took place in a health facility (Ministry of Health et al. 2017). Statistics show, that in Nepal one woman dies every eight hours due to complications during childbirth and 38 newborns die everyday from largely preventable causes (UNICEF 2015). There is a growing concern that devastation brought by the earthquake in April and May 2015 has further reduced availability of care for mothers and their newborns (UNICEF 2015).

1.3 Sustainable Development Goals

On 1 January 2016, The United Nations (UN) General Assembly adopted the new development agenda: the 2030 Agenda for Sustainable Development (United Nations 2016). The MDGs were replaced by the sustainable development goals (SDGs) under the leadership of the UN with consultation from multilple stakeholders (Maternal Health Task Force 2014; Requejo and Bhutta 2015). This new agenda goes well beyond the MDGs and is applicable for all countries. It outlines SDGs comprising a broad range of economic, social and environmental objectives targeted for more peaceful and inclusive societies. The SDG has 17 goals including Goal 3, a broad goal "Ensure healthy lives and promote well-being for all at the ages". The goal for maternal mortality reduction set under the health goal SDG 3.1 is:

"by 2030 reduce the global maternal mortality ration to less than 70 per 100,000 live births specific maternal health indicator" (WHO 2016b).

In order to reach this global goal, each country will need to contribute a two-thirds reduction in its MMR by 2030. The health-related goal is the Universal Health Coverage (UHC) which provides an overall framework for the implementation of a broad and ambitious health agenda in all countries. In addition, the WHO Ending Preventable Maternal Mortality (EMPP) initiative has a secondary goal which states: "no country should have an MMR that is more than 140 or twice the global average target for MMR" and has focused on eliminating wide inequity in MMRs between countries. All countries are called upon to focus on equity and eliminate disparities amongst their subpopulations (Maternal Health Task Force 2014).

1.4 Skilled birth attendance and birthing centre

It is important to understand who the skilled (birth) attendants are in order to understand skilled birth attendance.

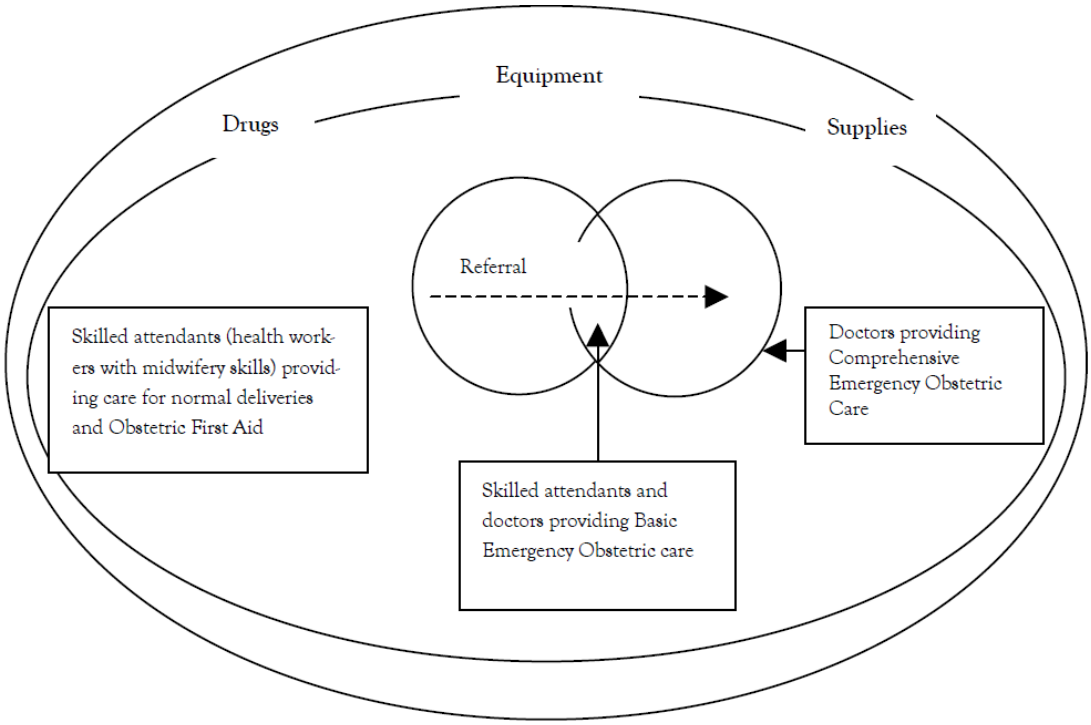
> "The term skilled attendant refers exclusively to people with midwifery skills (for example doctors, midwives, nurses) who have been trained to proficiency in the skills necessary to manage normal deliveries and diagnose, manage or refer complications. They must be able to manage labour and delivery, recognize the onset of complications, perform essential interventions, start treatment, and supervise the referral of mother and baby for interventions that are beyond their competence or not possible in the particular setting" (Graham et al. 2001, p. 4).

It is important to understand what midwifery skills are in order to understand skilled birth attendance.

> "Midwifery skills are a defined set of cognitive and practical skills that enable the individual to provide basic health care services throughout the period of the perinatal continuum and also to provide first aid for obstetric complications and emergencies, including live saving measures when needed" (Graham et al. 2001, p. 4).

"Skilled (birth) attendance" has been defined as "the process by which a woman is provided with adequate care during labour, delivery and the early postpartum period" (Graham et al. 2001, p. 4). This definition implies that the process of skilled attendance requires a skilled attendant and an enabling environment that includes adequate supplies, equipment and infrastructure as well as efficient and effective systems of communication and referral (Graham et al. 2001). The environment also includes political and socio-cultural influences along with more proximate factors such as supervision, training, deployment and health system financing. A schematic representation of skilled attendance at delivery is shown in Figure 2. There is a minimum set of skills that a skilled attendant is required to have and thus they equate with nurses with midwifery skills (Graham et al. 2001). The global coverage of SBA has increased, rising from 58% in 1990 to 73% in 2013. However, more than 40% of women in the Africa and South-East Asia did not have access to a skilled health provider at birth in 2013 (WHO 2015b).

Figure 2: Schematic representation of skilled attendance at childbirth



Adapted from Graham et al. (2001)

There are three levels of skilled birth care available for pregnant women, namely: (i) skilled attendants providing care for normal births and obstetric first aid; (ii) skilled attendants and doctors providing basic EmONC (BEmONC); iii) doctors providing comprehensive EmONC (CEmONC). For further discussion on BEmONC and CEmONC, see Chapter 3. Birthing centres (BCs) are a component of health service delivery at local level which is designed to provide care for natural vaginal birth without complications. They can function either inside or outside the hospital setting. If located outside of the hospital setting, BCs needs to have access to the hospital with a delay of no more than an hour (Schneck et al. 2012). BCs provide a midwifery-led model of care where midwives provide maternity services in a community or hospital setting, normally to healthy woman with uncomplicated

or low risk pregnancies (Sandall et al. 2016). Evidence from studies shows that midwifery-led model of care have high maternal satisfaction rates (Sandall et al. 2016) and can reduce unnecessary interventions with insignificant difference in maternal mortality and morbidity in or out of hospital (Rooks 1999; Sandall et al. 2016; Hodnett et al. 2010). Research in many countries suggests that women experience positive childbirth assistance in BCs (Jamas et al. 2013) and they are also found to be cost-effective with efficient use of resources (Renfrew et al. 2014; Sandall et al. 2016).

1.5 Midwifery and midwives in Nepal

Skilled care during labour and childbirth along with prompt management of complications can not only prevent 50% of newborn mortality and 45% of intra-partum stillbirths, but also thousands of maternal deaths (WHO 2014a). Midwives and others with midwifery skills can provide some of the most effective maternal and newborn health interventions, including elements of BEmONC and CEmONC (Renfrew et al. 2014). Midwifery practice is described as:

"skilled, knowledgeable, and compassionate care for childbearing women, newborn infants, and families across the continuum throughout pre-pregnancy, pregnancy, birth, post-partum and the early weeks of life. Core characteristics include optimising normal biological, psychological, social and cultural process of reproduction and early life; timely prevention and management of complications; consultation with and referral to other services; respect for women's individual circumstances and views; and working in partnership with women to strengthen their own capabilities to care for themselves and their families" (Renfrew et al. 2014, p.1130). *The State of the World's Midwifery* report states that midwives are competent

to deliver 87% of the estimated need in 73 countries when they are educated and regulated to international standards (International Confederation of Midwives et al. 2014).

Auxiliary Nurse Midwives (ANMs) provide much of the primary care maternity services in Nepal, especially at BCs. ANMs have 18 months of pre-service training in nursing and midwifery after ten years of schooling. They are trained to assist normal births, identify complications, refer women to more specialist care and offer health promotion. They are mostly deployed in rural Nepal where there is a lack of proper health care facilities (Tamang 2011), but some are also deployed in urban hospital settings (Rana et al. 2003). ANMs provide ANC, childbirth and postnatal care (PNC), as well as more general sexual and reproductive health care (International Confederation of Midwives et al. 2014). It is worth noting that Nepal does not currently recognise midwifery as a separate profession from nursing (Bogren et al. 2013a; 2013b). The literature suggests that midwives working in rural or urban areas, if provided with continued professional development and training opportunities, can be equally competent in their skills (Hundley et al. 2007).

1.6 Background of Nepal

Nepal is a small landlocked country located between China in the north and India in the east, west and south. The terrain of Nepal consists of three major regions: (i) Terai or flat river plain of the Ganges in the south; (ii) central hilly regions; (iii) the Himalayas in the north. With a population of almost 30 million and popular for its scenic beauty, it contains eight of the world's ten highest peaks, including Mount Everest and Kanchenjunga. Nepali is the official language and is spoken by 45% of the total population. The majority of the population follow the Hindu religion, and there were 125 caste/ethnic groups reported in the national census of 2011 (Central Intelligence Agency 2018). The capital of Nepal is

Kathmandu and other big cities consist of Pokhara, Biratnagar, Butwal, Bhairahawa and Nepalganj. Only 19.7% of people live in cities, with the rest residing in rural areas (Central Intelligence Agency 2018).

The total life expectancy at birth is 71 years, literacy rates are 76.4% for males and 53.1% for females; the sex ratio was 0.95 male(s)/female. Nepal is amongst the least developed countries in the world, with a gross domestic product (GDP) of United States Dollar (USD) 78.59 billion in 2017, of which 5.8% was spent on health (2014). In comparison, its neighbouring country India had a GDP of USD 2.611 trillion in 2017, of which 4.7% (2014) was spent on health (Central Intelligence Agency 2018).

1.7 Background of Nawalparasi district

1.7.1 Location

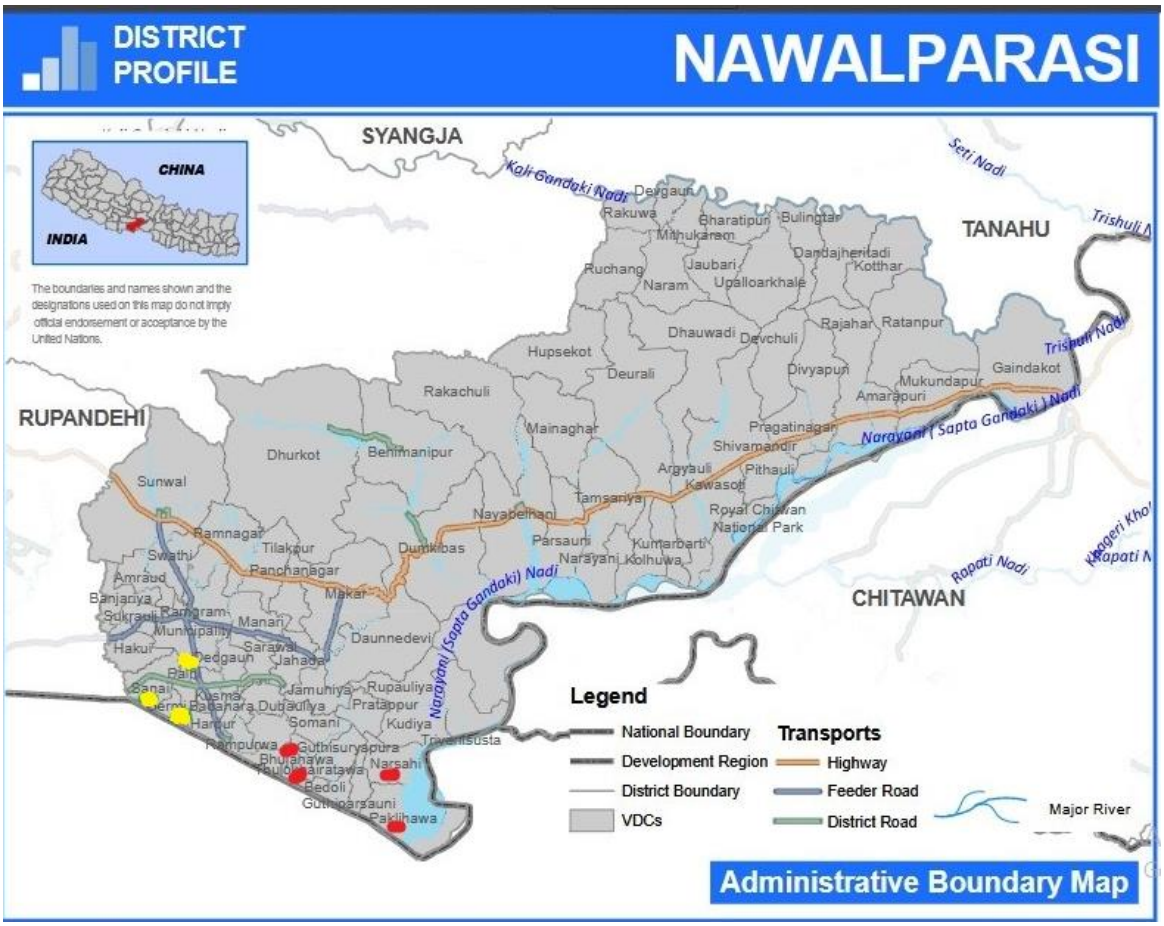
The Nawalparasi district is one of the 75 districts of Nepal with an area of 2162 km^2. This district is situated between 91 and 1,936 meters above sea level and borders India in the south. It consists of three varying regions: mid-mountain, the Siwalik range and the plains or Terai. Accordingly, the climate also varies from mildly temperate to sub-tropical and tropical. The headquarters of Nawalparasi is Parasi Bazaar. The Nawalparasi district is connected to the Rupandehi district in the west, the Palpa and Tanahun districts in the north, the Chitwan district in the east and the Indian border in the south. It consists of the Nawalpur valley which is a part of the greater Chitwan valley of inner Terai where most of the population are Terai caste and Tharu; Brahmins and Magar also settled there after migrating from the hills. The longest road, the Mahendra highway, 99 km in length, lies in this district. Major cities of Nepal such as Butwal, Siddharthanagar, Tansen and Bharatpur are sub-

metropolitan municipalities and are located in neighbouring districts (District Coordination Committee Office Nawalparasi 2017).

Before the formation of the federal structure of Nepal into seven provinces (Nepal Government Ministry of Federal Affairs and Local Development 2017), Nawalparasi was a part of the Lumbini zone. Only after the formation of federal provinces, was the Nawalparasi district divided into two parts and ended up as part of two provinces – Provinces 4 and 5 (MyRepublica 2015; Nepal Government Ministry of Federal Affairs and Local Development 2017). To avoid confusion, this document does not include the information related to the provinces, since one of the surveys done in this study (the pre-intervention survey) was conducted before the formation of the federal structure (Nepal's new Constitution 2015 established federalism).

A map of the Nawalparasi district with the survey site is shown in Figure 3. The baseline household survey was conducted in seven village development committees (VDC)s represented by four red dots and three yellow dots (see Section 4.2.3). The pre-intervention and post-intervention surveys included only four VDCs represented by red dots. A VDC is a smallest administrative unit in rural Nepal and consists of few villages. It is important to note that the VDCs included in the intervention have now been merged into two different village municipalities; however, to avoid confusion, the term VDCs is used throughout this thesis, as when the study was conducted these study sites were still called VDCs.

Figure 3: Map of Nawalparasi district



Source: United Nation Nepal Information Platform 2015

1.7.2 Demographics

The following description of the Nawalparasi district is based on the most recent 2011 census of Nepal. The total population of the Nawalparasi district was 643,508 which increased 29.0% from 1991 (Central Bureau of Statistics 2014). The mean age at first marriage was 18.5, and the mean age at child bearing was 26.9 years in 2011. The sex-ratio was 108.3 and distribution of the absentee population was 65,335. Ramgram municipality, which is also the administrative capital, has a total area of 34.72 sq. km and a population density of 834.48 per sq. km. The total number of households was 4,982 with a population of 28,973; male numbered 15,505 and females 13,468. The distribution of the population by

religion shows that the majority of people, 567,450, were Hindus (88.2%), 38,615 (6.0%) were Buddhists, 24,160 (3.8%) were Muslims, 11,180 (1.7%) Christians and 354 (<1%) Kirat. The predominant caste was Hill-Brahmin (112,559), followed by Magar (112,331) and Tharu (97,275). The predominant mother tongue spoken was Nepali (263,476) followed by Bhojpuri (186,840) and Magar (87,588). The literacy rate for males was 79.9% and for females was 62.8%, the overall adult literacy rate being 63.7%. As of 2011, there were 10,837 people with some kind of disability in the district with physical disability being the highest (3,692). Total people aged 10 years and above were 510,153 of which 265,688 were employed, 3,119 were unemployed, 52,363 were not economically active and the economic activity of 1,681 was not stated. Occupation wise, most people were involved in agriculture, forestry and fishery (167,621), 25,510 were involved in craft and related trade work and only 18,577 were involved in the service and sale sectors. There were 690 primary schools, 358 lower secondary schools and 204 secondary schools in the Nawalparasi district in 2013 (Central Bureau of Statistics 2014).

1.7.3 Health system and maternal health related information

There is one district public health office (DPHO) and one district hospital, both located in Parasi. There is also one private hospital, five primary health care centres (PHCC)s, eight health posts (HP)s and 60 sub-health posts (SHP)s (Ministry of Health Nepal et al. 2017). According to the latest annual report (2016), the percentage of women who had all four ANC checkups as per protocol was 55.2%, similarly the percentage of births attended by a SBA was 26.0%, the percentage of institutional deliveries was 26.0%, the percentage of births attended by a health worker other than SBA was 0.4%, the percentage of normal deliveries was 97.8%, the percentage of assisted deliveries was 0.8%, the percentage of

delivery by Caesarean Section (CS) was 1.4% and the percentage of women who had three postnatal visits was 4.4% (Ministry of Health 2016).

1.8 Study interventions

Green Tara Nepal (GTN), a Non-Governmental Organisation (NGO) working in rural Nawalparasi started supporting two BCs established by the government in Thulo Khairtawa health post and in Narsahi health post. GTN has also been running comprehensive maternal health promotion programmes since 2012 (van Teijlingen et al. 2012). Before starting the study interventions, GTN conducted a feasibility study in the Nawalparasi district which found that the VDCs chosen for the intervention were approximately seven kilometers from the main highway that provides access to services. Transportation services including the availability of ambulances was very poor in these areas. In addition, the assessment of SHPs found problems with the services they offered, which included low staffing levels, and a lack of technical skills and interest on the part of health staff. Transportation facilities are important since the time taken to reach health institutions for childbirth affects the utilisation of maternity and childbirth services (Demilew et al. 2016; Mahato et al. 2017). While all the VDCs have an SHP, not all have facilities available for giving birth. Furthermore, the nearest PHCC was located approximately 8 kilometers away along a dirt road. The ambulance service was very expensive and usually took 4 hours or more to arrive. When women experienced intrapartum complications, they sometimes had to travel on a bull cart, which is not only dangerous and unsanitary but also took longer to reach the higher-level health institution (GTN 2017).

The intervention programme was carried out by GTN in the period 2014 to 2016. This intervention consisted of two components: (i) providing enabling factors and (ii) conducting

health promotion programme in community. Two BCs: Thulo Khairtawa and Narsahi were supported in many ways such as refurbishing BC building, providing staff such as ANMs, training them and providing financial and technical support as needed. Similarly, health promoters were recruited in Thulo Khairtawa VDC who together with local Female Community Health Volunteer (FCHVs) were involved in conducting health promotion programmes to local women. Baseline survey was carried out before intervention i.e. in 2012 and post-intervention survey was carried after intervention i.e. in 2017. The details of the intervention programme are discussed in Sections 1.8.1 and 1.8.2.

1.8.1 Supporting birthing centres

The government established many BCs across Nepal with a vision of increasing access and improving the quality of maternal, neonatal, child health and family planning services. GTN supported two of these BCs located in the rural area of Nawalparasi in several ways including refurbishing buildings, providing equipment and health promotion to staff and training ANMs. Thulo Khairtawa BC, which was established in 2015, also serves its neighbouring VDCs: Bhujahawa, Guthi Suryapura and Baidauli. It is equipped with the necessary equipment and two ANMs, who not only conduct safe deliveries but are also responsible for health promotion activities in the catchment areas. Narsahi birthing centre was established in 2016 and serves a few more VDCs in its vicinity. Since the majority of the population in the Nawalparasi district lives in rural areas, it was thought that supporting these two BCs and providing birthing facilities to poor rural women would have a positive impact on improving maternity and childbirth services in this area (GTN 2017).

1.8.2 Health promotion and mother group meetings

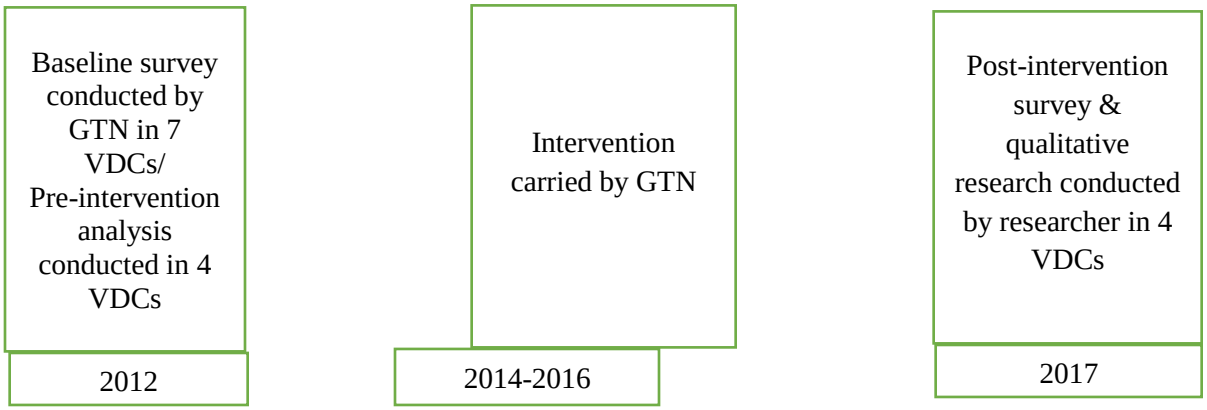
GTN implemented community focused maternal, neonatal and child health interventions through health promotion and community mobilisation activities. GTN funded health promoters in Thulo Khairtawa, who trained FCHVs in Narsahi VDCs. These health promoters and FCHVs met mother groups and discussed various health and women's issues. They also conducted meetings with mothers-in-law in addition to conducting women's group meetings as a strategy for creating demand for the utilisation of the BCs. For example, in 2016, there were 157 mothers-in-law meetings and 334 women's group meetings (GTN 2017). Health promotion and education sessions were organised regularly on a monthly basis during the meeting. For this, GTN developed a curriculum covering content on ANC/PNC, baby feeding, sanitation and hygiene. The classes were informal and participatory, lasting about 1-2 hours. To make the discussion participatory and lively, GTN staff members used various types of teaching materials. Such activities were helpful in raising the awareness of community women and improving their knowledge of maternal and child health related problems. A similar health promotion intervention was implemented by GTN in order to improve uptake of maternal health provision in another rural area of Nepal (Sharma et al. 2017).

1.9 Timeline for study

A baseline survey was conducted by GTN in the year 2012 before this Ph.D. study started. This baseline survey included seven VDCs: Thulo Khairtawa, Narsahi, Bhujawa, Paklihawa, Germi, Sanai and Palhi in rural Nawalparasi district. Although the baseline survey was carried out in seven VDCs, the results of only four VDCs were selected for inclusion in the pre-intervention survery analysis: Thulo Khairtawa, Narsahi, Bhujawa and Paklihawa. The main reason for only including these four VDCs in the pre-intervention survey was because

they were situated in the catchment area of the intervention site (i.e. the location of the two BCs), while the other three excluded VDCs lie further away as shown in Figure 3. For the post-intervention survey, which was conducted in year 2017, only the four VDCs included in the pre-intervention survey were followed up. This adjustment was needed in order to make the surveys comparable and to account for the 'school effect'. The 'school effect' focuses on ecological-level processes or school-environmental factors (in this case health facilities available in the VDCs) rather than individual-level processes (Bonell et al. 2013). Using four villages for both pre-intervention and post-intervention analysis ensures similar school or ecological environments are compared. This is an essential consideration while conducting a repeated cross-sectional longitudinal study, as discussed in Section 4.2.2.1. A timeline showing when were the surveys and qualitative study undertaken in this longitudinal study is shown in Figure 4.

Figure 4*:* Timeline for study



1.10 Researcher's background

The researcher conducted this study as a Nepali woman originally belonging to the southern part of Nepal and thus can understand and speak the local language spoken by women in this study. This was an advantage as she would be considered as a "cultural insider" who

possessed both the linguistic and cultural expertise to communicate with specific cultural communities which otherwise would be difficult for even "knowledgeable outsiders" (Birman 2005). In getting involved as an insider, it would be easier to get access and trust from the community where the study was conducted (Ryan et al. 2011). Since only women would be involved in the research, it was also important that a women researcher would be involved. Being a mother, she would be able to understand and empathise with the problems and experiences of the participants. It is also worth noting that she became a mother during this study and have the experience of raising a baby while also completing her Ph.D. This added extra insight and practical understanding of maternal health problems and how to deal with them.

Having a Master's degree in public health, she has worked both as an academic in a public university in Nepal as well as a Public Health Officer under the Government of Nepal (GoN), Ministry of Health and Population. Specifically, she worked in the maternal health services, and have experience and a deep interest in monitoring the quality of maternal health care provided by health institutions including BCs, PHCCs and hospitals. This illustrates why she chose this subject for her Ph.D. study and how she was suited to conduct this research.

1.11 Summary

This chapter introduced maternal health and state of maternal mortality worldwide and in Nepal. It has also discussed ways to improve maternal health during pregnancy, birth and post-partum, highlighting the importance of skilled birth attendance and the SBAs. In this context, the importance of midwives is discussed with a focus on ANMs working in BCs in Nepal. Moving further into the context of research, the district where the research was

conducted in is described, including a general introduction, health status and the interventions that were carried out in this district. This provides the basis for Chapter 2, which explains in detail the plans and policies related to maternal health in Nepal, the state of BCs, health promotion and maternal health and the conceptual framework used for the study. At the end, the researcher's background is provided to understand the context and the basis for choosing this research topic.

CHAPTER 2 Literature Review

The literature review was conducted to: (i) provide an overview of GoN plans and policies related to maternity care; (ii) situate BCs in the health system of Nepal; (iii) demonstrate how BCs can impact upon the quality of maternity care; (iv) outline health promotion and the role of ANMs. This review was undertaken at the start of the Ph.D. process to find and analyse the literature at the time, and to help shape the research questions, aims and objectives of the research. Any new research published during the Ph.D. research has been incorporated into the Discussion (Chapter 7) to link it to the analysis and in findings of the thesis. For fulfillment of first objective, documents related to plans and policies on maternity care were searched from the Ministry of Health and Population and Department of Health Services website. For the fulfillment of second, third and fourth objective, the researcher searched the following electronic databases: MEDLINE Complete, Science Direct, Science Direct Index, CINAHL Complete, Google Scholar, Social Sciences Citation Index, PsycINFO, and British Library EThOS. The key search terms were maternal health, maternity care, birth(ing) centres/centers, health workers, health promotion, ANMs, developing countries, low income countries, South Asian countries and Nepal. The inclusion criteria were: peer-reviewed papers in English; any study or policy report on maternity care and BCs in Nepal; health promotion and ANMs; research in BCs in South Asia. The exclusion criteria included non-English papers, studies in high income countries and those studies whose full text could not be found. A research paper was also published based on the literature review conducted on the state of BCs in Nepal (Mahato et al. 2016) (Appendix I.2).

2.1 Government plans and policies

Nepal's First Long Term Health Plan (1975-1990) considered the need for the delivery of consistent and functional health services (Dixit 1999). During the late 1980s and early 1990s, when maternal health was politically prioritised by the Nepalese government, primary health care was progressively being extended to more rural areas (Engel et al. 2013). The National Health Policy 1991 created health service structures to reach the VDC level by strengthening the primary health care system. This allowed for modern health facilities and trained health care providers to be available in rural areas (Dixit 1999). The National Health Policy 1991 aimed to establish a SHP in each VDC, PHCCs to be established in each of the 205 electoral constituencies or existing HP to be upgraded to PHCCs with one medical doctor and three beds (Ministry of Health and Population 2014a). One of the main objectives of the subsequent Eighth Five-Year Plan (1992-1997) was to extend maternal, child health and family planning to below district level. The Second-Long Term Health Plan covered 1997-2017 and emphasised the provision of comprehensive basic health services to the majority of the rural population. This plan established district, zonal, regional and central hospitals with an emphasis on the referral mechanism (Ministry of Health and Population 2007). This plan also introduced the Essential Health Care Package to improve the health status of the most vulnerable population such as women, children, and poor and disadvantaged people.

Nepal's National Safe Motherhood Programme started in 1997 with its goal of reducing maternal and neonatal mortality and morbidity by addressing avoidable factors that are caused by complications of pregnancy and childbirth. This programme has made significant progress, with the development of policies and protocols, the most important being a policy on SBA endorsed in 2006 by the Ministry of Health and Population (2013). This policy

identifies the importance of an SBA being present at each birth and also embodies the Government's commitment to prepare SBAs including doctors, nurses and midwives across the country. The Safe Motherhood and Neonatal Health Long Term Plan (2006-2017) included a strategy of strengthening and expanding delivery by SBAs having basic and comprehensive obstetric care services at all levels and establishing a functional referral system (Ministry of Health and Population 2013).

The Maternity Incentive Scheme, later called the Safe Delivery Incentive Programme, started in 2005 in districts with a low human development index (Powell-Jackson et al. 2009). It provided incentive payments to women to attend health facilities and increased the number of health workers and SBAs. During this period the NDHS 2006 reported delivery at health facilities to be 18%, and the delivery assisted by an SBA was only 19% (Ministry of Health and Population et al. 2007). The policy of providing free deliveries nationwide, also known as *'Aama Surakchha Programme'* started in 2009 to promote deliveries at health institutions attended by trained health professionals (Witter et al. 2011).

The current health policy includes ensuring the availability of quality health services as a basic right of every citizen free of charge as part of UHC. One of the strategies of this policy is to appoint one doctor and one nurse, along with other paramedic staff, in each VDC and appoint one nurse-midwife in each ward of a VDC (Ministry of Health and Population 2014b).

2.2 Important figures related to maternal health

The presence of an SBA at delivery nearly doubled from 19% in 2006 to 36% in 2011 but did not meet the 60% target by 2015 (Ministry of Health and Population et al. 2012) because there was a shortage of skilled professionals, especially midwives (Rath et al. 2007; Bogren

et al. 2013a). *The State of the World's Midwifery* shows that in 2012 almost 200,000 of 606,000 total births in Nepal were not attended by an SBA, almost all of them in rural areas where 84% of the total population lives (International Confederation of Midwives et al. 2014).

In recent years there has been an improvement in births conducted by SBAs. According to a recent annual report, this was 54% of births in 2015/16 (2072/73 BS) which was a small decline from 57% in the previous year (Ministry of Health 2016). Similarly, NDHS 2016 reported that 58% of births were conducted by SBAs and 57% of all deliveries took place in health facilities. The high percentage of home births, namely 43% births in 2016 (Ministry of Health et al. 2017) is still a concern for maternal and neonatal health as most of them are not attended by a SBA and any complication that may arise during home birth might prove to be fatal if these women cannot reach appropriate CEmONC facilities.

2.3 State of birthing centres in Nepal

The initial institutional contact point for basic health services in the Nepalese health system is SHPs, which offer community-based outreach clinics and monitor the activities of FCHVs. Above this point is the HPs, which offer all services offered by SHP along with birthing services (Ministry of Health and Population 2013). The third level of care is provided by PHCC which act as the linkage between a community and a referral hospital. It has been difficult to retain doctors in PHCCs in Nepal, but with a cadre of adequately trained midwives in BCs it has been possible to effectively provide basic essential obstetric care services (Rath et al. 2007). Nevertheless, there is still a shortage of skilled professionals, especially midwives (Rath et al. 2007; Bogren et al. 2013b). The decrease in institutional

delivery has been attributed to the earthquake and fuel crisis in 2015 (Ministry of Health 2016).

In Nepal, EOC services are available at three levels of care: i) basic obstetric care available at HPs and SHPs including stabilising patients with obstetric first aid, making an appropriate referral and arranging transport; ii) BEmONC available at PHCCs to prevent and treat haemorrhage, puerperal sepsis, eclampsia, infection and manage prolonged labour; iii) CEmONC available at hospitals (regional, zonal and district) to manage all the above plus CS, anaesthesia and blood transfusion (Ministry of Health 2004).

The GoN has been working to expand the number of BCs across the country. The Family Health Division recorded a total of 1,134 BCs established in SHPs, HPs and PHCCs in July 2014 (Ministry of Health and Population 2014c). The number of BCs at HPs increased to 1,621 in 2014/15 and to 1,755 in 2015/16. However, despite the increase in BCs the proportion of institutional deliveries taking place at BCs (HPs) declined from 29% in 2014/15 to 27% in 2015/16 (Ministry of Health 2016).

2.4 Obstacles/facilitators for utilisation of birthing centres in Nepal

As discussed in Section 1.5, midwifery is currently not recognised as an autonomous profession in Nepal as there was no legislation in place and there is also a lack of university level midwifery education. In addition, nurses rather than ANMs were mostly involved in midwifery association (Bogren et al. 2013). Still, in Nepal midwifery-led care was found to be as safe as consultant-led care and the BC model was found to be appropriate for low risk births (Rana et al. 2003) as was found in other countries (Schneck et al. 2012; Sandall et al. 2016). BCs are helpful in increasing institutional births in remote areas (Engel et al. 2013). However, there is an increasing trend of bypassing BCs to deliver at hospitals which

provides a more medical model of care (Brunson 2010; Karkee et al. 2015). Uptake of services available at BCs depends not only on increasing the number of SBAs but also considering enabling factors to enhance the uptake (Morgan et al. 2014). The enabling factors necessary to improve quality of care include effective training, appropriate infrastructure, ongoing professional development, supportive supervision, sufficient supplies and equipment, support from the community and other health workers and finally effective referral mechanisms (Morgan et al. 2014).

A rapid assessment of the 'Aama Surakchha Programme' (policy of providing free childbirth nationwide) in six districts reported a high demand for maternity services in hospitals resulting in high bed occupancy rates ranging from 80-145% in 2011-2012 (Ministry of Health and Population 2013). Conversely, the same assessment showed BCs were poorly used, indicating ineffective use of available services at BCs, which if used effectively would help reduce overcrowding in the hospitals (Ministry of Health and Population 2013). Moreover, almost 59% of ANM positions are vacant, whilst almost one-quarter of women (22.6%) had to pay for essential drugs despite birth services being free of charge (Prasai 2013). This rapid assessment also reported a growing trend of CS of 17% in the referral hospitals (Ministry of Health and Population 2013). The necessity of the increasing CS rate has been questioned by some (Bogren et al. 2013a). Research has also shown that increased use of tertiary services by healthy women admitted during the latent phase of labour will drive obstetric interventions (Chuma et al. 2014). This also points to restricted use of tertiary services in referral hospitals in order to limit unnecessary interventions during labour and childbirth. Studies focusing on staff perspectives on barriers to accessing birthing services in Nepal found that healthcare staff are aware of the barriers women face while reaching the

facility but have limited insight of the barriers occurring within the facility and especially in their own facility (Milne et al. 2015).

A study on the quality of care of BCs in rural Nepal found irregular and poor-quality services, inadequate human and capital resources, and poor governance amongst factors that prevented good service delivery and acted as health system challenges (Khatri et al. 2017). Besides these, there were contextual barriers including difficult geography; poor birth preparedness practices; harmful cultural practices and tradition; low level of trust in health workers that contributed to under-utilisation of the BCs (Khatri et al. 2017).

Inequity between the lowest and highest wealth quintile is amongst the major economic factors determining delivery at a health facility and utilising services provided by a SBA. The latest NDHS report shows a wide gap of 66.5% in the proportion of births in health facilities and 70.8% in the proportion of births attended by an SBA between the lowest and highest wealth quintile (Ministry of Health and Population et al. 2012). One study that used data from three NDHS reports (2001, 2006, 2011) and one multiple indicator cluster survey (2014) concluded that women from low socioeconomic groups were six times more likely to deliver without skilled assistance than those from higher socio-economic backgrounds (Målqvist et al. 2017). Social and ethnic position also determines the uptake of EOC services, with women of low caste and ethnic minority under-utilising the services at birthing institutions compared to their counterparts belonging to high ethnic castes and groups (Rath et al. 2007; Shah et al. 2015). Furthermore, there has been a dramatic increase in demand for facility-based births which has outstripped supply and thus threatens to compromise the quality of care offered by health facilities (Pradhan et al. 2012; Prasai 2013; MoHP Nepal et al. 2014).

Preventing avoidable deaths and debilitating morbidities is highly reliant on the importance of monitoring the quality of care of maternal and neonatal health services in public as well as private health facilities (MoHP Nepal et al. 2014). The government has focused on establishing BCs in the SHPs, HPs and PHCCs in rural areas with the aim of providing access and quality institutional delivery services to poor and marginalised populations. However, simply increasing the number of BCs does not ensure the provision of quality services to the rural population (Ministry of Health and Population 2014c).

Studies on births conducted by SBAs in South Asian countries showed an increase in facility-based deliveries and mostly in private facilities in India and Bangladesh (Pomeroy et al. 2014). Although births conducted by SBAs increased for Bangladesh, India and Pakistan, the proportion of births attended by doctors increased faster than the proportion of births attended by a midwife, auxiliary midwife or nurse midwife in these countries (Pomeroy et al. 2014; Van Lerberghe et al. 2014). In Bangladesh however, there was limited growth in SBAs which they attributed to the focus of national programmes on upgrading EmONC facilities rather than training and deploying midwives (Collin et al. 2007). Additionally, inequities in the utilisation of maternity services and skilled birth attendance existed in the different socioeconomic status of women in Bangladesh.

Several contributing factors for the uptake of birth services offered by SBAs in Nepal have been identified (Baral et al. 2010). These include distance to health facilities and availability of transportation facilities, poor infrastructure, availability of services, cost and convenience, staff shortages and attitudes, gender inequality and women's autonomy.

2.5 Health promotion

Conventionally, health promotion is regarded as: 'a process of enabling people to increase control over and improve their health. It moves beyond a focus on individual health and behaviour towards a wide range of social and environmental interventions' (WHO 2016a). Health promotion, therefore, is not only about disease prevention but also general health protection and education. Health promotion is a socially constructed approach which means health is embedded in social life; health-related behaviour is more about social life and the structure of society contributes to the well-being of its members (Stephens 2008). Lucas and Lloyd (2005, p. 7) described health promotion as: "We believe that if 'health' is to mean anything beyond the absence of cure of disease, then 'health promotion' should have as its primary foci of activity the emotional, social, spiritual and societal aspects of everyday life."

Health promotion has a multi-focused approach which is truly multi-disciplinary in nature. Health promotion promises to make links between environments and behaviour, policy and participation, lifestyle and social organisation and public policy and health (Bunton and Macdonald 2002).

The major health promotion initiative called '*Health for All in the 21st Century'* established by WHO (1999) focuses on addressing inequality and clearly recognises that health promotion should involve societal, governmental and global responsibility for the health of individuals and communities. Health promotion acknowledges the role of the individual, community and society in nurturing awareness, social support, development of autonomy and empowerment of all its members to make it reachable to all. In order to make health promotion successful, it requires participation of all stakeholders including government, social services, education, employment, and service users (WHO 1984).

2.5.1 Maternal health and health promotion interventions

In 2015, WHO published guidance on health promotion interventions for maternal and newborn health where recommendation of interrelated interventions was made to improve access to, and use of, skilled care during pregnancy, childbirth and after birth (WHO 2015c; Smith et al. 2017). These recommendations were grouped into different categories according to the strength of recommendation and quality of evidence. High quality evidence meant further research was unlikely to change confidence in the estimate of effect; moderate quality evidence meant further research was likely to have an important impact on confidence in the effect; low quality of evidence meant further research was likely to have an important impact on estimate of effect and was likely to change the estimate. Finally, very low quality of evidence meant any estimate of effect was very uncertain (WHO 2015c).

- Strongly recommended with low or very low-quality evidence: These included birth preparedness and complication readiness, male involvement, partnership with traditional birth attendant, culturally-appropriate skilled maternity care, companion of choice at birth, community participation in quality improvement process and in programme planning and evaluation interventions.
- Strongly recommended with moderate quality evidence: These included two recommendations; companion of choice at birth and community mobilisation through facilitated participatory learning and action cycles. These were highly recommended, and their effect had been mainly studied in rural settings where access to health services was poor.
- Conditional recommendation with very low-quality evidence: These included, maternity waiting homes recommended to be implemented in contexts with limited access to services or for populations in rural areas and community-organised

transport schemes recommended only when it was not possible to organise more sustainable and reliable sources of transport.

- Paucity of evidence, more research needed: These included sexual and reproductive rights/rights to access quality care and community participation in Maternal Death Surveillance and Response (MDSR). These were considered as recommendations because of their potential to inform women about their rights and their link to important human rights principles. However, because of the paucity of evidence, additional research and documentation were recommended to find how they affected care-seeking outcomes.

2.5.2 Community participation and maternal health promotion

Community participation plays an important role in the health promotion of mothers. A study focusing on building the capacity of community committees to monitor and promote maternal health care-seeking showed that the use of antenatal care, delivery care and care of perceived complications was significantly higher in villages with higher levels of community capacity for maternal health promotion (Brazier et al. 2015).

A randomised controlled trial (RCT) study involving women's group meetings as an intervention in a rural area of Nepal found women's groups which worked through participatory learning and action can lead to improved maternal and newborn survival. The effect of the intervention occurred through learning about maternal and newborn health, building the confidence of group members and interaction with communities while developing strategies to address problems (Morrison et al. 2010). Mother's groups were similar to women's group whom the local health promoters of GTN met to discuss issues related to women's health (Section 1.7.2).

2.5.3 Midwifery and health promotion

A primary care model is thought to be best for most women of childbearing age and newborn infants who are healthy and at low risk of complications (Sakala and Newburn 2014). The primary care model of childbirth includes preventative measures, promotion of normal physiologic labour and birth, detection of complications, assessing medical care and ensuring that emergency measures are carried out according to the scope of midwifery practice and are aligned with the competencies for basic midwifery practice (Fullerton et al. 2011). The core element of midwifery care is providing care and support that promotes normal biopsychosocial processes, optimises labour, birth, breastfeeding and attachment (Sakala and Newburn 2014), thus adhering to a more social model of childbirth (MacKenzie and van Teijlingen 2010).

Midwives are health promoters by the nature of their profession. Health promotion is a core competency of midwifery and not an extended role (Bowden and Manning 2006). There are several instances where midwives can play the role of a health promoter such as in issues related to teenage pregnancy, smoking cessation, breastfeeding, domestic violence, mental health promotion, sexual health promotion and so on (Beldon and Crozier 2005; Bowden and Manning 2006).

2.5.4 ANMs in Nepal and health promotion

Health promotion is considered a key component of nursing and midwifery. The ANMs working in rural BCs clearly have a role in promoting the healthcare of women during pregnancy, as well as in the intrapartum and postpartum periods. However, there is a need for studies to establish the role of ANMs in health promotion in Nepal. Interestingly, the curriculum of ANM education in Nepal (Vocational Training CDD 2014) is largely oriented

on health education and there is little use of health promotion approaches throughout the document. There is also a lack of job descriptions available to ANMs in practice, which further obscures the health promotion activities performed by this cadre of health professionals (Bogren et al. 2013b). It has been found that the term 'health promotion' has often been used interchangeably with health education. However, health promotion is so much more than just educating women and communities about their health (Bowden and Manning 2006). Health education is considered a part of health promotion and its effectiveness will be enhanced if there is a supportive environment established by a healthy public policy (Norton 1998). Although the National Safe Motherhood Program was established in 1997 and has outlined many health promotion goals including the expansion of delivery by SBA, BEmONC and CEmONC services at all levels, the role of ANMs in health promotion is not clearly defined (Ministry of Health and Population 2013). Health promotion activities carried out by ANMs in rural parts of Nepal are similar to those performed by midwives in Ghana and include: weight management; infection prevention; personal hygiene; family planning; counselling on harmful substances such as alcohol, drugs and tobacco (Owusu-Addo 2015). As the determinants of health are multifaceted, it is important that health promotion strategies should not only be focused on changing individual behaviour but should also be focusing on social and environmental factors (Norton 1998). In the Nepalese context, women have less control over decisions related to birth processes; for example, in going for ANC visits (Simkhada et al. 2010). Therefore, it is important that midwives work in partnership with mothers and families, especially mothers-in-law, thus facilitating decisions about the care they need (Beldon and Crozier 2005).

Promotion of inter-sectoral collaboration as stressed by the National Safe Motherhood Program needs to be given more importance (Ministry of Health and Population 2013). In

neighbouring India, the role of ANMs in maternal health promotion is well established (Avanish and Meerambika 2013). The promotion of wellbeing during pregnancy and universal immunisation in rural areas falls largely within the remit of ANMs (Malik 2009). The National Rural Health Mission acknowledges the significant health promotion role of ANMs at the interface of safe motherhood services and rural communities across India (Government of India 2005). The role of ANMs as health promoters was also highlighted and published as a research paper by the author (Mahato et al. 2018a) (Appendix I.5).

2.5.5 Female Community Health Volunteers as health promoter

FCHVs are the lowest level of community health providers in Nepal and are the first contact for providing primary health care programmes within the public healthcare system (Panday et al. 2017). FCHVs were introduced in 1988 by the GoN and there are 51,470 FCHVs working nationally (Ministry of Health and Population 2013). The key role of the FCHVs is to promote health and healthy behaviours of mothers and people in the community to promote safe motherhood, child health, family planning and other community-based health services (Ministry of Health and Population 2013). FCHVs have an important role in providing basic maternal health care in rural Nepal and promoting health-seeking behaviour in order to minimise serious delays in receiving healthcare (Panday et al. 2017). Another important element of the FCHVs role is health promotion and health education in the local community (Ministry of Health and Population 2013). Although FCHVs have the potential to provide basic maternity care and promote health-seeking behaviour amongst women, this cadre of community health workers needs to be reimbursed and provided with educational training to ensure that they can work effectively (Panday et al. 2017).

2.6 Quality of care

It is important to understand what quality of care means in order to improve the quality of health care. Earlier, Donabedian (1980, p.5) defined quality of care as: "the application of medical science and technology in a manner that maximises its benefit to health without correspondingly increasing the risk", but this definition tended to focus on biomedical outcomes. The WHO (2006, p. 9-10) vision defines quality of care as: "the extent to which health care services provided to individuals and patient populations improve desired health outcomes. In order to achieve this, health care needs to be safe, effective, timely, efficient, equitable, and people-centered". This definition of quality of care characterises quality in health care and health systems. Therefore, it focuses on health systems as a whole and on the quality of the outcomes they produce. According to another definition provided by the Institute of Medicine (1990, p. 21), which is relevant to maternal health: "quality of care is the degree to which health services for individuals and populations increase the likelihood of desired outcomes and are consistent with current professional knowledge". Finally, yet another definition of quality of care is more inclusive and addresses user and provider satisfaction, social, emotional, medical and financial outcomes as well as aspects of equity and performance according to standards and guidelines. According to the definition of Wilson and Goldsmith (1995, p. 231), quality of care is defined as: "the sum of its four components: technical quality, resource consumption, patient satisfaction and values".

Technical quality is measured by patients' health status improvement, resource consumption is measured by costs of care, patient satisfaction is measured by patient perception of the subjective or interpersonal aspects of care and values are measured by the acceptability of any trade-offs that must be made amongst the three previous outcomes.

The WHO also described high-quality health services as those that: "involve the right care, at the right time, responding to the service users' needs and preferences, while minimising harm and resource waste" (WHO 2018, p. 11). This WHO (2018) document also mentions that quality health care increases the likelihood of desired health outcomes and is consistent with seven measurable characteristics: effectiveness, safety, people-centeredness, timeliness, equity, integration of care and efficiency. For example, the introduction of the Lady Health Worker Programme increased first-hand contact with health care workers in Pakistan, which resulted in improved management of pneumonia and lowered neonatal mortality (WHO 2018).

2.7 Quality of care in maternal health

2.7.1 Definition

There are different definitions of quality of care in maternal health based on various perspectives. One working definition by Hulton et al. (2000, p. 9) refers to: "Quality of care is the degree to which maternal health services for individuals and populations increase the likelihood of timely and appropriate treatment for the purpose of achieving desired outcomes that are both consistent with current professional knowledge and uphold basic reproductive rights". This definition separates quality into two parts: (i) the quality of the provision of care within the institution; (ii) the quality of the care as experienced by users. This definition recognises that the use of services and outcomes are the result of care from the perspective of provision of care as well as women's experiences of care. The WHO definition of quality of care in maternal health is provided by Tunçalp et al. (2015, p. 1046), namely: "Quality of care during childbirth is reflected by available physical structure, supplies, management, and human resources with the knowledge, skills and capacity to deal with pregnancy and

childbirth – normal physiological, social and cultural processes, but prone to complications that may require prompt life-saving interventions."

Yet another definition of quality of care in maternal health was provided by Pittrof et al. (2002), including four elements of quality specific to maternity care that are context specific and can change over time. These include: most users of maternity services are well; some users will develop conditions requiring a higher level of maternity care (when complication arise); maternity care is aimed at at least two recipients – the mother and baby; non-biomedical outcomes may be more important than for other areas of health care because childbirth is a culturally and emotionally sensitive area. Subsequently, a definition of quality in maternal health care was developed by Pittroff and colleagues (2002).

2.7.2 Too little, too late (TLTL) vs Too much, too soon (TMTS)

The poor quality of maternal health services has overshadowed the improvement seen in maternal related mortality and morbidity (Austin et al. 2014). Two situations related to the provision of poor quality of maternal health services are described by literature: (i) too little, too late (TLTL) and (ii) too much, too soon (TMTS). TLTL is a tendency towards pushing births in health facilities that have inadequate staff, training, infrastructure, and commodities, insufficient evidence-based clinical practice that ultimately leads to poor quality of services, mostly seen in LMICs (Austin et al. 2014). TLTL with inadequate access to services, resources, or evidence-based care leads to the absence of timely access to quality care. TLTL was historically associated with low-income countries, but can occur wherever there are disparities in sociodemographic variables including wealth, age and migrant status. Inequitable application of timely evidence-based care is often the culprit (Miller et al. 2016).

TMTS refers to the poor quality of available services linked to over-medicalisation of birth accompanying the rapid increase in facility births and is mostly seen in high-income countries (Graham et al. 2016). TMTS is historically associated with high-income countries, but is increasing everywhere because of more women using health facilites for childbirth. There is a growing rate of potentially harmful practices, especially in private sectors that reflect weak regulatory capacity as well as little adherence to evidence-based guidelines (Miller et al. 2016).

Both TLTL and TMTS represent the clincal care aspect of the widening diversity and divergence in maternal health (Graham et al. 2016). Although TLTL is ascribed to LMICs and TMTS is ascribed to high income countries, the presence of social and health inequities means that these two extremes co-exist in many countries. It is seen that many structural factors affect quality care but adherence to evidence-based guidelines could help health-care providers to avoid TLTL and TMTS (Miller et al. 2016). Overall, quality of care in health facilities can be improved by adhering to evidence-based practices and quality assurance (Getachew et al. 2011).

2.7.3 Respectul maternity care

A systematic review (Renfrew et al. 2014) identified that women value relevant, timely information and support, to maintain dignity and control, in addition to appropriate clinical interventions. Therefore, universal access to quality maternal care requires respectful application of evidence-based guidelines with attention to women's individual, cultural, personal and medical needs.

Respectful Maternity Care (RMC) recognises that safe motherhood must be expanded beyond the prevention of mortality and morbidity and encompasses the unique right of every

childbearing woman to receive care that includes respect for the woman's autonomy, dignity, feelings, choices and preferences including choice of companionship and cultural rituals at birth in institutional delivery, wherever possible (WHO et al. 1999; Reis et al. 2012). The RMC approach is centred on the individuals and based on the principles of ethics and respect for human rights. This RMC movement overlaps with the humanization of childbirth movement (Reis et al. 2012). RMC is closely related to removing disrespect and abuse during pregnancy and childbirth (White Ribbon Alliance for Safe Motherhood 2011). A landmark review of evidence conducted for disrespect and abuse in facility-based childbirth by Bowser and Hill (2010) identified following seven categories of disrespect and abuse: physical abuse; non-consented care; non-confidential care; non-dignified care; discrimination based on specific patient attributes, abandonment of care; and detention in facilities. These categories of disrespect and abuse and the corresponding rights (White Ribbon Alliance 2011) are shown in Table 1.

Table 1: Tackling disrespect and abuse: Seven rights of childbearing women

CATEGORIES	CORRESPONDING RIGHT
1. Physical abuse	Freedom from harm & ill treatment
2. Non-consented care	Right to information, informed consent & refusal; respect for choices/preferences, incl. right to companionship of choice wherever possible
3. Non-confidential care	Confidentiality, privacy
4. Non-dignified care (incl. verbal abuse)	Dignity, respect
5. Discrimination based on specific attributes	Equality, freedom from discrimination, equitable care
6. Abandonment or denial of care	Right to timely health care to highest attainable level of health
7. Detention in facilities	Liberty, autonomy, self-determination & freedom from coercion

A similar systematic review conducted on the disrespect and abuse of women during childbirth in Nigeria also concluded that there was a presence of disrespect and abuse in Nigeria which affected the utilisation of health facilities for delivery and created psychological distance between women and health providers (Ishola et al. 2017). This review also suggested some ways in which the presence of disrespect and abuse could be reduced, which included: education of women about their rights, strengthening health systems to respond to specific needs of women at childbirth, improving training with focus on improving interpersonal aspects of care and implementing and enforcing policies on RCM.

In Nepal due to the lack of midwives, SBAs are in charge of providing respectful maternity care. A study to explore the concept of respectful maternity care as perceived by the SBAs in Nepal found that SBAs understood the importance of respectful care at birth but focused more on the notion ‘safety comes before comfort’ (Erlandsson et al. 2014). This study stressed the fact that the contribution of relatives is essential in addition to providing medical care. The implication of this study was that: (i) family members need to accompany women during birth; and (ii) midwives need to be trained, recruited and deployed in the areas of most need.

Addressing two fundamental issues is crucial to improving maternal health: quality of maternal health care for all women and access to care for those left behind. It is a call for quality, equity and dignity which can be better achieved through integrated effort to improve maternal and neonatal health (Kinney et al. 2016). Assessing quality of care of health facilities also can be helpful in determining their utilisation or under-utilisation (Audo et al. 2005), which is also done in this study.

Studies on quality of maternity care services in Nepal were mostly quantitative in nature (Rana et al. 2003; Rana et al. 2007; Karkee et al. 2014a; Shah et al. 2015), although some qualitative studies have addressed the perspective of health care providers only (Morgan et al. 2014). One particular study assessing the quality of BCs in Nepal focused on clinical rather than the social aspects and also captured the quality of care from the perspective of health care workers only (Ministry of Health and Population 2014c). There is thus a need for conducting qualitative research to support the findings from quantitative research, which not only takes into account the perspective of health care providers, but also that of service users.

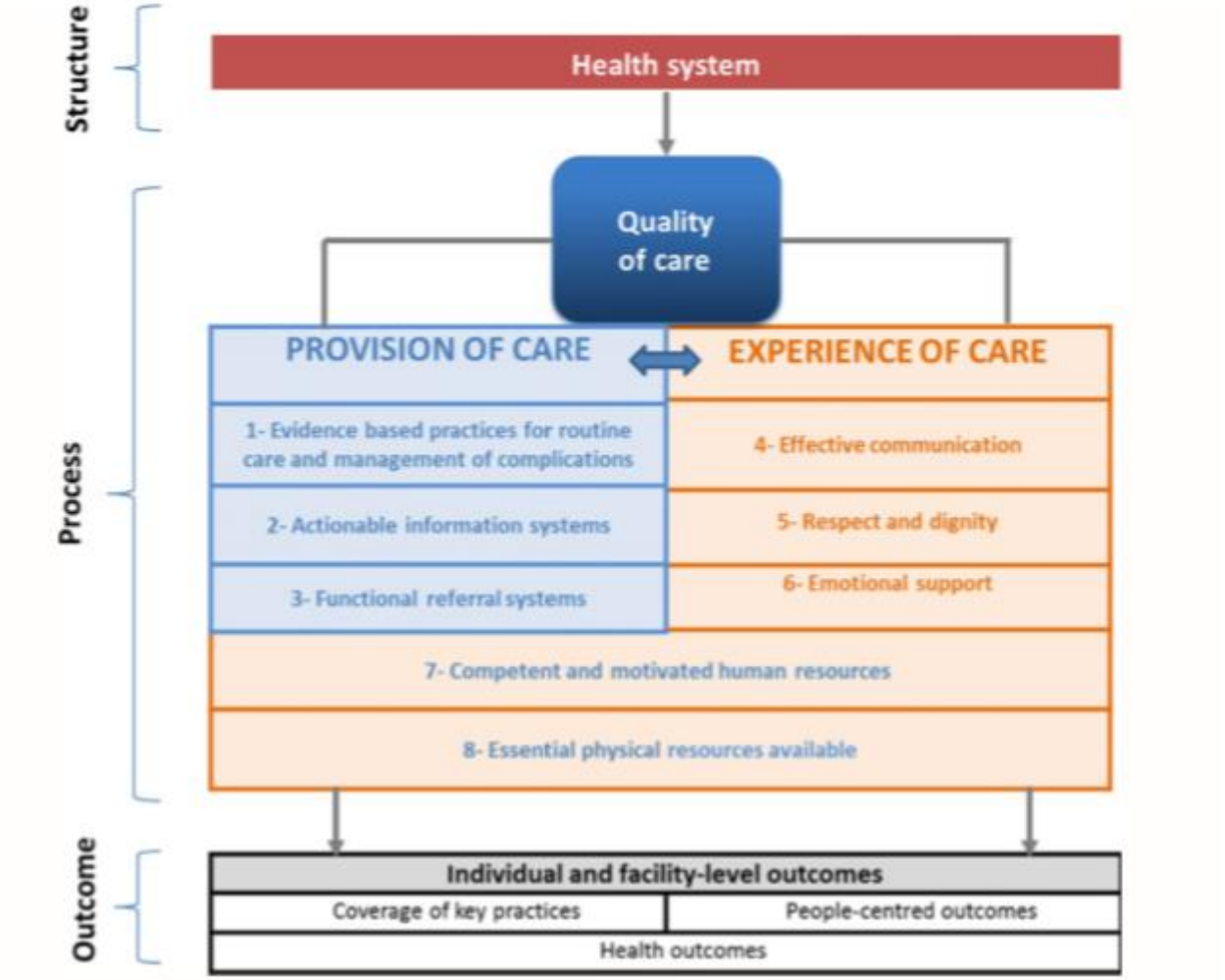
2.8 Conceptual framework

The existence of maternal health services does not guarantee their use and the use of these services does not guarantee optimal outcomes. In this context, the concept of quality of care can perhaps help explain why women do not use services, use them late or suffer undesirable outcomes even if they access maternal health services (Hulton et al. 2000). Quality of care is a multi-dimensional concept, therefore there is a need for a framework with important domains of measurement and pathways in order to achieve the desired health outcomes and improve the quality of care (Tunçalp et al. 2015). The first quality of care framework was developed in 1988 and became known as the Donabedian model of quality of care for health facilities (Donabedian 1988). Since then there has been development of various frameworks for measuring the quality of care for mothers and newborns taking into account different elements from the provision of care to the experience of care in health facilities (Hulton et al. 2000; Renfrew et al. 2014; Tunçalp et al. 2015).

This study adopted the WHO framework for quality of maternal and newborn care as shown in Figure 5 (Tunçalp et al. 2015). This framework is a comprehensive tool used for conceptualising the quality of care for maternal and newborn health by identifying domains which should be targeted to assess, improve and monitor care within the context of the health system (Tunçalp et al. 2015). The reason for using this framework is that it is comprehensive. The framework considers different models which can guide health care providers, managers and policy makers to improve health service quality. This includes the systems model where quality of care is related to different dimensions of the health care system and measured at different points in the system. Alternatively, the perspectives model evaluates care provision from the perspectives of health care providers and managers and the experience of care from the perspectives of patients (Raven et al. 2012).

Furthermore, the WHO Quality of Care Framework (Tunçalp et al. 2015) requires competent and motivated human resources and the availability of essential physical resources. In addition, the framework requires evidence-based practice for routine and emergency care; actionable information systems where record keeping systems enable review and audit and functional referral systems between levels of care. The experience of care includes effective communication to ensure women and their families understand what is happening and what their rights are, that they receive care with respect and dignity and are able to access their social and emotional support of choice (Tunçalp et al. 2015).

Figure 5: WHO Quality of Care Framework for maternal and newborn health



In Nepal, improvement in the quality of care of health facilities means addressing human resources, essential physical resources and to some extent, the provision of care which includes mostly the referral system. However, the provision of evidence-based practice and actionable information system are less dealt with. The components of experience of care – effective communication, respect and dignity and emotional support are not found mentioned (Ministry of Health 2016). The government recruits ANMs on short-term contracts to ensure 24-hour service at BCs, PHCCs and hospitals (Ministry of Health 2016), but often these short-term contracts are not renewed on time, which again hampers the swift

operation of the daily routine of these health facilities. Similarly, for the smooth referral of women, the government allocated emergency referral funds in 16 districts with 14 more districts allocated these services later on. The government also allocated a budget to regional health directorates to airlift women in need from remote areas where motor transport is not available or where emergency referral is needed. All health facilities follow the government guidelines which may or may not be evidence based and furthermore, health facilities in rural areas which includes BCs do not have any information systems but rely only on paper-based registers for record keeping (Ministry of Health 2016).

The WHO framework (Tunçalp et al. 2015) was used for both qualitative and quantitative studies as a guide for assessing the quality of care of health facilities in the rural areas of the Nawalparasi district in Nepal (especially the BCs) and ultimately the uptake of services at BCs. This Ph.D. study mostly focused on the process rather than the health system and outcomes of the quality of care framework. As seen in Figure 5, both the provision of care and the experience of care were assessed by interviews and focus group discussions with health care providers as well as women using the services at BCs, along with quantitative questionnaires. In this way, mixed methods were used to evaluate and assess the quality of care and ultimately utilisation of maternal and childbirth care services provided by the BCs in rural areas in Nepal.

2.9 Nepal's earthquake 2015 and birthing centres

A massive earthquake measuring 7.8 (Moment Magnitude Scale) M_w scale hit Nepal on April 25, 2015 followed by a strong aftershock of magnitude 6.8 on May 12. The total death toll reached 9,000, injured 23,000 and damaged 900,000 houses (Nepal Disaster Risk Reduction Portal 2015). Although Nepal has made substantial progress in reducing maternal

mortality, there is concern about the sustainability of maternal and child health care following the earthquake (Khanal et al. 2015). A total of 1.4 million women and girls of reproductive age were affected in the 14 severely affected districts out of the country's 75 districts. There were an estimated 93,000 pregnant women during the earthquake, 10,000 delivering each month and 1,000 to 1,500 at risk of pregnancy related complications requiring emergency obstetric care. However complete damage to the health facilities of these severely affected districts destroyed nearly 84% (375 out of 446) of the facilities (UNFPA Nepal), most of them offer birthing facilities which could further worsen already low health facility delivery practice (35%) and delivery by SBAs (36%) (Ministry of Health and Population et al. 2012). Reports have also shown that after the two major earthquakes destroyed maternity facilities, around 12 babies were being born every hour in Nepal without access to basic healthcare. Lack of urgent action placed the lives of almost 18,000 babies and mothers at risk (UNICEF 2015). Almost 70% of BCs in the 14 most affected earthquake districts have been destroyed or damaged and the surviving facilities are overwhelmed. It was opportune during 2015 to reinstate the network of mobile outreach clinics providing delivery care by SBAs while the process of re- building BCs continued (Khanal et al. 2015).

Nepal, with its focus on preventive medicine and primary health care could also take this earthquake as a challenge to improve and increase UHC (Basnyat et al. 2015). The National Health Policy 2014 (Ministry of Health and Population 2014b) has also highlighted the need for earthquake resistant buildings in new health care facilities, retrofitting existing ones and implementing the disaster response plan. This is indeed an appropriate time for the Nepalese health system to translate these policies into action. Multinational agencies were already on board to offer their help to improve sexual and reproductive health services while also

building the capacity of health care providers (UNFPA Nepal 2015). These details about the state of BC infrastructure after the 2015 earthquake was also highlighted and published as a research paper (Mahato et al. 2015) (Appendix I.1).

2.10 Research questions linked with methods and objective

The central research questions are as follows:

1. What are the perinatal care facilities available in rural community setting in Nawalparasi?

2. What are the factors associated with the quality of care of BCs in Nepal?

3. What are the barriers and facilitators to women using BCs in their communities?

2.11 Aims of the study

The aim of this research is to study the effects of an intervention of supporting BCs and community-based health promotion programme on increasing access and utilisation of perinatal care facilities in community setting.

2.12 Objectives of the study

2.12.1 Objectives related to quantitative data

1. To evaluate utilisation of BCs in rural community of Nawalparasi district

2. To evaluate changes in perinatal care facilities available during pre and post-intervention survey

2.12.2 Objectives related to qualitative data

3. To elicit the views of community women and health care providers regarding the services available at BCs.

4. To assess quality of care of services available at BCs.

2.13 Summary and next steps

The literature review chapter describes in detail the Government of Nepal's plans and policies related to maternal health. It further explores obstacles and facilitators for the utilisation of maternal and childbirth services available at the primary care facilities, especially the BCs, and found that several factors contributed to low utilization of BCs, with quality of care being one of them. Next it describes community-based health promotion, which is another important intervention done during this study, maternal health promotion and the role of ANMs in health promotion was also touched upon. Discussion on the quality of care in maternal health and the quality of care framework for institutional deliveries was undertaken afterwards. Finally, the research questions, aims and objectives of this study are discussed.

This chapter thus outlines a need for determining factors affecting quality of care and affecting provision of maternal health services, especially those available from BCs. More detail about these aspects is provided in the next chapter which describes the scoping review conducted on factors affecting quality of care provided by basic emergency obstetric care and midwife-led facilities worldwide.

CHAPTER 3 Scoping review

The literature review found several factors that affected the quality of care provided by the BCs (Chapter 2). It also highlighted that BCs were bypassed and under-utilised and that there were many barriers that prevented uptake of services available from the BCs. To further explore these factors which affected uptake of services provided by the BCs, a scoping review was conducted with the title "Determinants of uptake of basic emergency obstetric and neonatal care facilities and midwife led facilities in low- and middle-income countries: A scoping review". Although the initial plan was to conduct the scoping review including the BCs, but the literature search did not find enough papers on utilisation of care of BCs which led to expanding the population to the basic emergency obstetric and neonatal facilities. The organisation of this chapter is slightly different from other chapters because it is based on a published paper (Mahato et al. 2018b) (Appendix I.3). The details of the scoping review including the process, results and discussion are provided below.

3.1 Introduction

Maternal mortality is considered a major challenge to the health systems worldwide and is defined as death of a woman during pregnancy, childbirth or in the 42 days after delivery, irrespective of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (Hogan et al. 2010). The ultimate goal of Safe Motherhood Initiative is to ensure attendance of every birth by a skilled health professional and every woman who has an obstetric complication receives care within a BEmONC (usually a lower level facility such as health centre or maternities) or in a CEmONC (usually a district, regional and referral hospitals) (Paxton et al. 2006; Freedman et al. 2007). Together this package is called EmONC, a package of medical

interventions required to treat major direct obstetric complications as identified by WHO, UNICEF and UNFPA (WHO and UNICEF 1997). BEmONC provides the following set of seven 'signal functions': administration of parenteral antibiotics; administration of anticonvulsants; administration of parenteral uterotonics; manual removal of placenta; removal of retained products; assisted vaginal delivery; and resuscitation of the newborn (WHO 2009). On the other hand, CEmONC provides all the BEmONC signal functions and in addition perform surgery and provide blood transfusion (Paxton et al. 2005).

The existence of maternal health services does not guarantee its use and the use of these services does not guarantee optimal outcomes. In this context, the concept of quality of care comes into play which can explain why women do not use services, use them late or suffer an undesirable outcome even if they access the maternal health services (Hulton et al. 2000). Poor quality of maternal and newborn care is one of the major causes of maternal deaths and consequently there is a need for overall quality improvement throughout continuum of care along with improved comprehensive emergency care if substantial reduction in maternal mortality is to be achieved (WHO 2005; Graham and Varghese 2012; Souza et al. 2013). Poor quality of maternal services is not only about the available resources in health systems and nor is it only about the absence of services (Renfrew et al. 2014). There are different measures of quality used for maternal health in LMICs which include utilisation of services, adherence to appropriate clinical practices or provision of health services for example availability of drugs and equipment, case fatality rates, training scores, avoidable mortality, client satisfaction and out of pocket expenditure (Dettrick et al. 2013). Specifically, for determining quality of care in obstetric services, measures such as evaluation of provider's knowledge and attitudes, evaluation of care based on medical charts and direct observation of service providers during episode of care are used (Faye et al. 2014). However, there are

studies which show evidence or a need to focus on non-facility determinants of maternal health service quality including health policy, supply distribution, community acceptability, equitable access to care, socio-economic inequities, traditional attitudes and practices and status of women (Byrne et al. 2013; Dettrick et al. 2013; Shiferaw et al. 2013; Hajizadeh et al. 2014; Ng et al. 2014).

There are some studies on non-attendance at birth facilities in LMICs (Shiferaw et al. 2013; Ng et al. 2014) as well as a few reviews (Say and Raine 2007; Metcalfe and Adegoke 2013). However, there are no studies or systematic reviews on factors affecting quality of obstetric services in BEmONC facilities or in midwife-led BCs within LMICs. There is thus a need for a scoping review to understand reasons for poor utilisation of such facilities in LMICs. To address this gap in knowledge, the student and her supervisors conducted a scoping review of the literature, with following objectives: (i) to identify factors that affect access to and utilisation of the BEmONC and midwife-led facilities in LMICs; and (ii) to synthesize results and write a narrative overview.

3.2 Method

3.2.1 Search

The literature search was conducted using 'My Search' at Bournemouth University Library database which includes the following databases: MEDLINE, Science Direct, CINAHL, Social Science Citation Index, Harvard Library Bibliographic Dataset, Scopus, Cochrane, and British Library EThOS. The search terms used along with various Boolean operators are summarized in Table 2.

Table 2: Summary of search terms and strategy

Search terms	
BEmONC facilities (S1)	"*birth* cent*" OR "*childbirth* cent*" OR "maternal-child health cent*" OR "delivery room*" OR "maternity hospital*" OR "maternity waiting home*" OR "primary health care" OR "primary care" OR "primary healthcare"
Skilled birth attendant (S2)	"skill* birth attendan*" OR "skill* deliver*" OR midwi*
Developing countries (S3)	"developing countr*" OR "developing nation*" OR "developing population*" OR "developing world*" OR "less developed countr*" OR "less developed nation*" OR "less developed population*" OR "less developed world*" OR "lesser developed countr*" OR "lesser developed nation*" OR "lesser developed population*" OR "lesser developed world*" OR "under developed countr*" OR "under developed nation*" OR "under developed population*" OR "under developed world*" OR "underdeveloped countr*" OR "underdeveloped nation*" OR "underdeveloped population*" OR "underdeveloped world*" OR "middle income countr*" OR "middle income nation*" OR "middle income population*" OR "low income countr*" OR "low income nation*" OR "low income population*" OR "lower income countr*" OR "lower income nation*" OR "lower income population*" OR "underserved countr*" OR "underserved nation*" OR "underserved population*" OR "underserved world*" OR "under served countr*" OR "under served nation*" OR "under served population*" OR "under served world*" OR "deprived countr*" OR "deprived nation*" OR "deprived population*" OR "deprived world*" OR "poor countr*" OR "poor nation*" OR "poor population*" OR "poor world*" OR "poorer countr*" OR "poorer nation*" OR "poorer population*" OR "poorer world*" OR "developing economy*" OR "less developed economy*" OR "lesser developed economy*" OR "under developed econom*" OR "underdeveloped economy*" OR "middle income econom*" OR "low income econom*" OR "lower income econom*" OR "low* gdp" OR "low* gnp" OR "low* gross domestic" OR "low* gross national" OR lmic* "third world*" OR "lami countr*" OR "transitional countr*"
Quality of care (S4)	"health care quality" OR "healthcare quality" OR "quality of healthcare" OR "quality of health care" OR "patient satisfaction" OR "standard of care" OR "health care quality indicators" OR "*respect*" OR "quality of care" OR "patient cent*ed care*"
Search strategy	(S1 OR S2) AND S3 AND S4

The search strategies were first tested with various combinations until the desired strategy was reached. The strategy was then subject to various restrictions in order to reduce the number of unrelated studies picked up in the search.

3.2.2 Eligibility criteria

There was difficulty in the problem formulation stage and in forming the inclusion and exclusion criteria for selecting studies given the nature of the research question (Bravata et al. 2005). The inclusion and exclusion criteria are given in Table 3.

Table 3: Inclusion and exclusion criteria

Inclusion criteria
1. Antenatal, intrapartum and (early) postpartum care of women
2. Maternity care provided in birth centres or health facilities providing basic emergency obstetric and neonatal care facilities
3. Studies published in English
4. Interviews with health care workers, women regarding quality of care
5. Qualitative and quantitative methodology
6. Published after 1995
7. Quality assessment based on CASP Checklist
Exclusion criteria
1. Training and evaluation programme
2. Quality of care in large maternity/private hospitals
3. Quality of care in emergency obstetric and neonatal care
4. Determinants of use of health facilities
5. Financial schemes for increasing facility-based delivery
6. Traditional birth attendant
7. Opinion/experience papers
8. Family planning issues
9. Prenatal and postnatal care
10. Systematic or literature review papers
11. Poor quality paper

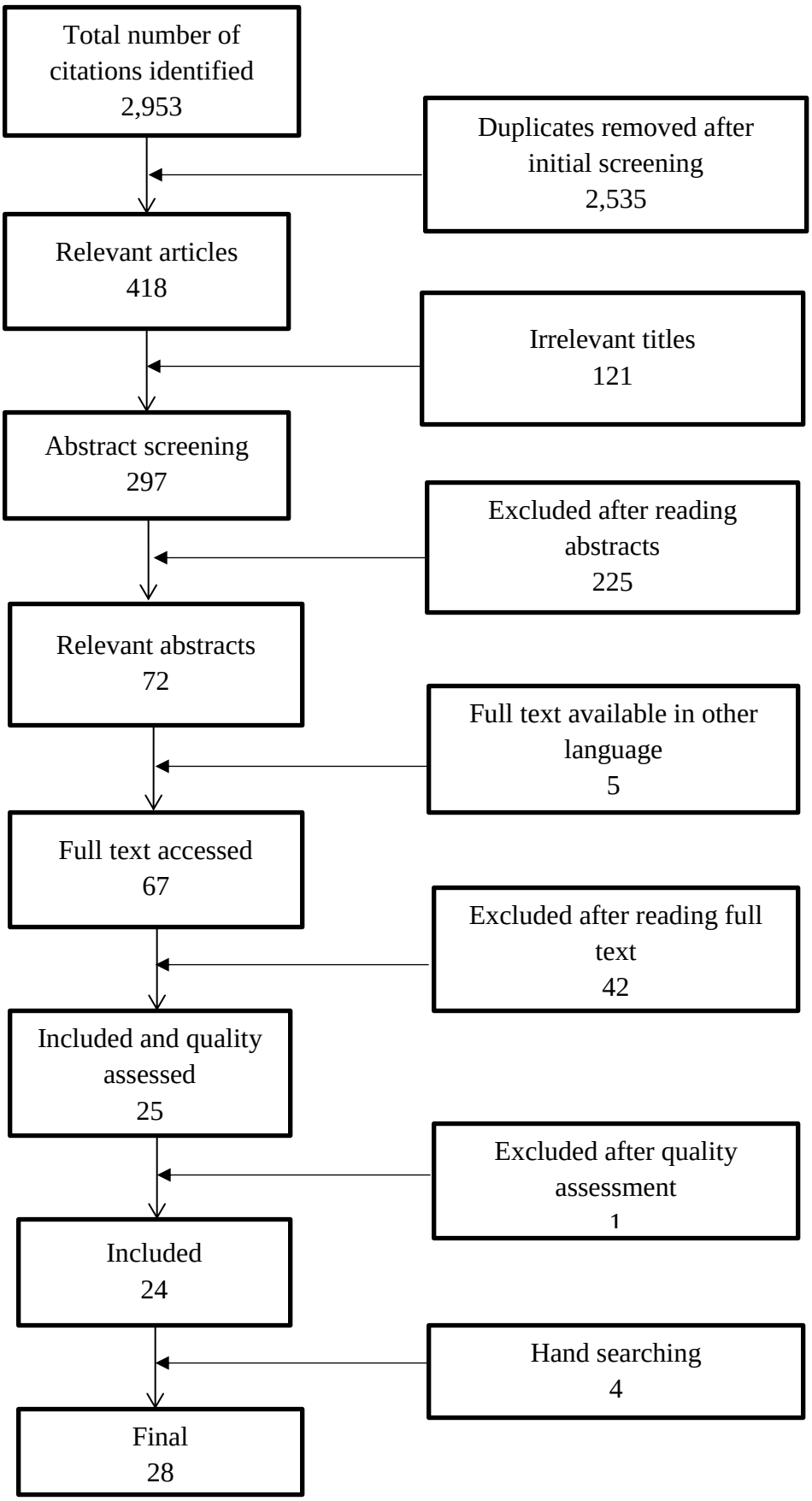
Only studies conducted after 1995 was included, choosing 1995 as a cut-off point as the International Conference on Population and Development took place in 1994. Also, only

studies in English language were selected because choosing studies in other languages meant using resources and time in translating these papers. Given limited resources and time available for this Ph.D., it was not thought appropriate to select papers in other languages.

3.2.3 Study selection

An initial search found 2,953 articles; which were screened for relevance and duplicates were removed; and only those with full text available were selected. Of 67 articles with full text 42 were excluded from this review because they were mostly hospital-based studies, discussing overall maternity services rather than labour and birth services, and discussing emergency obstetric care rather than basic obstetric care. Of the remaining 25 articles, one was excluded after quality assessment because of its poor methodological design. The quality assessment of the studies was done using the Critical Appraisal Skills Programme (CASP) Checklists (CASP 2015). This left 24 articles that were hand searched; another four studies were found that were relevant to the review and of acceptable quality. The final selection of 28 articles was done by the researcher and one of her supervisors and any disagreement in the selection of articles was resolved through discussion. In case of further disagreement, opinions of other supervisors were sought (Figure 6).

Figure 6: Flow diagram for selection of articles in the systematic review



3.2.4 Data extraction and synthesis

A data extraction form was developed by student and her first supervisor which was adapted from standard format and revised to meet the needs of this review. The data extraction was conducted by the first author, which was then reviewed by other authors for consistency. Any disagreement was resolved through discussion among the authors. A sample of a data extraction form is shown in Appendix A.

There was a range of outcomes measured in the studies that made it difficult to synthesise the data. Data synthesis was done as a narrative synthesis analysis by topics or issues and used words and text to summarise and explain the findings of the synthesis (Popay et al. 2006). Hence thematic analysis was used to focus on the main concepts related to utilisation of care.

Ethical approval was provided by Bournemouth University (Reference Id- 8710, see Appendix B, copy of letter received from the University).

3.3 Results

There were 28 studies selected for inclusion in the systematic review (Table 4). The majority of the studies were from Africa (20), followed by South Asia (3), other Asian countries, (3) and Latin America (2). Half of the 28 studies (n=14) were quantitative surveys or cohort studies, seven were qualitative, four were experimental and three used mixed methods. Ethical approval had been obtained for 18 studies, whereas 10 had no mention of ethical approval. Looking at the place of study, the majority was conducted in rural areas (n=20), three were conducted in urban settings and five were in sub-urban or a mixture of both urban and rural locations. Although all studies included normal births, the health facilities where the studies were conducted varied considerably. Most sites were health centres followed by

BCs or peripheral delivery units, PHCCs, communal health clinics, dispensaries and one hospital with BEmONC services. Table 4 provides details of the selected studies. Due to the size of Table 4, it is added towards the end of this chapter.

The majority of the studies measured perception and experiences of women, health providers and other concerned members of society, whereas others measured satisfaction with the services. Direct observation of normal deliveries, measuring facility attributes, observing the level of disrespect and abuse, measuring perceived quality of care and knowledge of birth care were other methods used to assess quality.

3.3.1 Lack of equipment and drugs at health facility

Quality of care was affected by the lack of availability of necessary equipment at the facility, lack of drugs or important procedures available at facilities was mentioned by 18 studies (Maimbolwa et al. 1997; Afsana and Rashid 2001; MacKeith et al. 2003; Duong et al. 2004; Leigh et al. 2008; Kruk et al. 2009a; Kruk et al. 2009b; Graner et al. 2010; Kruk et al. 2010; Nikiema et al. 2010; Kambala et al. 2011; Mezie-Okoye et al. 2012; Worku et al. 2013; Kruk et al. 2014; Phiri et al. 2014; Karkee et al. 2015; King et al. 2015).The lack of resources like gloves, sutures, sterilisers, water, electricity or even toilet facilities or a preference for availability of such resources at health facilities was seen.

> *"I lack proper instruments for suturing. I'm only able to suture the exterior. In the interior ruptures, I can do nothing. I can diagnose interior ruptures, but I have to ignore it because I don't have essential instruments for suturing" – (Midwife, Graner et al. 2010)*

Some studies also revealed that health facilities asked mothers to bring their own amenities such as shawl, boots, gloves, antiseptics, delivery kits and so on (Maimbolwa et al. 1997;

Leigh et al. 2008; Phiri et al. 2014) and failure to do so result into reprimand from midwives or the attending health personnel.

> *"…sometimes it is because we don't manage to buy what we are asked to buy at the facility. Things like jik, dish, chitenge (a ladies wrapper), bucket, new nappies and others, so you decide to die at home. You take a chance…. And if you go without these items, you are scared to be shouted at…" - (Woman from community, Phiri et al. 2014)*

However, the results of one study showed that having clean water or essential equipment, drugs and supplies were not associated with higher ratings of quality of care (Larson et al. 2014).

3.3.2 Availability of trained staff at health facility

The decision to deliver at a health facility was determined by availability of technically competent health providers as mentioned by several studies (Maimbolwa et al. 1997; Afsana and Rashid 2001; Duong et al. 2004; Leigh et al. 2008; Kruk et al. 2009a; Graner et al. 2010; Kambala et al. 2011; Mezie-Okoye et al. 2012; Tucker et al. 2013; Walker et al. 2013; Karkee et al. 2014b; King et al. 2015). The lack of trained staff at the health facility was not only a problem in rural facilities but also in several urban health facilities (Maimbolwa et al. 1997; Tucker et al. 2013; King et al. 2015).

> *"They face other problems when they get to the health services – no water, no electricity, no midwife or resources" – (Health extension worker, King et al. 2015)*

Some studies also indicated that health facilities are not open 24 hours which discourages women from attending for birth services (Leigh et al. 2008; Kruk et al. 2009a; Parkhurst and Ssengooba 2009).

Three studies (Afsana and Rashid 2001; Pettersson 2004; Graner et al. 2010) described how the health professionals, especially midwives at the BC or PHCC were found to be working

under physical and mental constraints: they worked alone, had long working hours, low collegial support and mistrust in their capabilities. There was also a hierarchical relationship between midwives and women which discouraged women to open up and tell everything without any fear or feeling intimidated (Afsana and Rashid 2001; Pettersson 2004; Graner et al. 2010). The need for education and training of health professionals was stressed in few studies (Maimbolwa et al. 1997; Pettersson 2004; Graner et al. 2010; Bayley et al. 2013).

3.3.3 Socio- economic factors

Socio-economic factors were mostly prevalent in the African studies and a few Asian ones. Adverse socio-economic status led to decreased utilisation of BEmONC services even when they were freely available. Apart from paying direct costs, there were hidden costs or informal charges linked with facility delivery (Maimbolwa et al. 1997; Afsana and Rashid 2001; MacKeith et al. 2003; Duong et al. 2004; Pettersson 2004; Parkhurst and Ssengooba 2009; Phiri et al. 2014). The hidden costs were costs of buying gloves and antiseptics, cord clamps, baby clothes, pads, and fees for attendants. Having financial problems was one of the major factors for not attending health facilities for birth (Duong et al. 2004; Pettersson 2004; Kruk et al. 2009b; Graner et al. 2010; Kruk et al. 2010; King et al. 2015). Other studies indicated households with higher wealth bypassed the nearest health or BCs to give birth at hospital which was considered better quality (Duong et al. 2004; Karkee et al. 2015).

> *"Sometimes I think for the money, for this we stay in the house with the TBAs and we stay closer as well. Because our mother-in-law also gave birth here, for this reason we stay in the house" – (Focus Group, Tucker et al. 2013)*

Women's vulnerable position in society and family dis-empowering them by not letting women make their own decision about giving birth at the nearest health facility were general societal barriers (Afsana and Rashid 2001; Duong et al. 2004; Pettersson 2004; Gyaltsen et

al. 2014; King et al. 2015). Domestic workloads, mother/fathers-in-law's decision to give birth at home, and being dependent on men were some factors associated with giving birth at home.

> *"The culture gives to the man, everything is decided by his understanding and beliefs, she follows his decisions… The decision maker is only the husband, the female cannot participate in decision making" - (Community interview, King et al. 2015)*

Having free maternity services was seen as an enabling factor to access health facilities for delivery (King et al. 2015). However, a matched cohort study in Burkino Faso, which attempted to determine the effect of user fee exemption on perceived quality of care of post-partum women, found no effect on perceived quality of care due to total fee exemption for delivery care (Philibert et al. 2014).

3.3.4 Attitude and behaviour of service provider

A number of studies (MacKeith et al. 2003; Pettersson 2004; Delvaux et al. 2007; Leigh et al. 2008; Kruk et al. 2009a; Kruk et al. 2010; Kambala et al. 2011; Kumbani et al. 2013; Phiri et al. 2014) reported issues related to attitudes and behaviours of health providers such as receiving poor care, lack of prompt attention, delay in receiving care and support, left unattended and being treated badly. A number of studies reported either no effect or a positive effect of respectful attitudes of service providers in deciding to attend BEmONC facilities (Afsana and Rashid 2001; Tucker et al. 2013; Karkee et al. 2014b; Karkee et al. 2015; King et al. 2015). Some participants expressed that they were treated well and were shown a caring attitude.

Disrespect and abuse from health professionals was reported in seven studies (MacKeith et al. 2003; Duong et al. 2004; Pettersson 2004; Kumbani et al. 2013; Larson et al. 2014; Phiri

et al. 2014; Asefa and Bekele 2015) in the form of being shouted or scolded, ill treatment, physical harm, beating women, lack of respect or treated rudely during labour. Receiving disrespectful and abusive care was found to affect the quality ratings of health facility as shown by Larson and colleagues (2014). There was one study which reported participants being treated well at the health facility (Tucker et al. 2013).

> *"I asked if you are doing this when labor started and I come. How is it going to be? I will be the same, shouting at us? That day you will even beat us then? She said, yes if a person is troublesome, we beat her up. We are very annoyed with some who exaggerate and cry when giving birth" - (Participant, Kumbani et al. 2013)*

3.3.5 Perceived quality of care

The perception of quality of the services available at the BEmONC facilities affected the utilisation of services at the health facility. Several studies (Kruk et al. 2009a; Parkhurst and Ssengooba 2009; Nikiema et al. 2010; Karkee et al. 2014b; Kruk et al. 2014) indicated that when perceived quality of care at the BEmONC facilities was less than very good, women chose to go to another health facility. Other studies (Duong et al. 2004; Walker et al. 2013; King et al. 2015) commented positively on the perceived quality of care available at the health facilities. Perceived quality of care was expressed in many different forms by various studies. Some of the

these factors which defined perceived quality of care at the health facility are explained below.

Emotional support during delivery was identified by few studies (Afsana and Rashid 2001; Worku et al. 2013). Having a family member or even maternity staff during delivery was

expected by women as a form of support (Afsana and Rashid 2001; Delvaux et al. 2007; Worku et al. 2013; Gyaltsen et al. 2014). One study results showed that the participants preferred family members with them rather than hospital staff during the delivery (MacKeith et al. 2003).

Satisfaction with the quality of delivery services available at the BEmONC facilities was assessed by three (Duong et al. 2004; Gyaltsen et al. 2014; Philibert et al. 2014) studies. The studies found the level of satisfaction provided at the facility was high and this was attributed to the flexibility offered by the facilities in birthing practices, choice of delivery, presence of family members during childbirth and patient-provider interaction. It was also seen in one study (Philibert et al. 2014) that the satisfaction index was higher for the poorest patients compared to the wealthiest. The proportion of very dissatisfied women was as high as 27% for the wealthiest women for three indicators: care provider-patient interactions, nursing care and delivery environment whereas the proportion of very satisfied women was as high as 48% for the poorest women for nursing care and delivery environment.
Some studies measured trust in health providers and facilities (Kruk et al. 2009a; Phiri et al. 2014). Women tend to use the BEmONC delivery site if they have high trust in health providers and their qualifications. Similarly, users tend to recommend a health facility or receive a recommendation from friends or relatives when there is trust in the facilities and the providers (Kruk et al. 2009a). Providing more services during labour and birth was seen by participants as an indication of a high-quality facility (Larson et al. 2014).

3.3.6 Access to health facility

Travelling a long distance was considered a hindrance to the health facility for delivery (Kambala et al. 2011; Phiri et al. 2014; King et al. 2015). Women also feared giving birth on

the way to the health facility (Kumbani et al. 2013; Phiri et al. 2014). Access to the health facility was seen as a problem not only in rural areas but also in at the urban settings (King et al. 2015). However, there were studies reporting bypassing the nearest primary care facility to give birth at a hospital or a better health facility due to low perceived quality in the nearest facility (Parkhurst and Ssengooba 2009; Kruk et al. 2014; Karkee et al. 2015). Two studies however showed there was no effect of distance on ratings of quality of a primary health care facility (Duong et al. 2004; Larson et al. 2014).

> *"Though we have got this "Zamup" ambulance (bicycle ambulance), somebody is in labour and stays very far, maybe 25 kilometers away. The husband comes here, he collects the ambulance, and by the time he reaches the village, maybe he will find she has already delivered. So, long distances" – (Midwife, Phiri et al. 2014)*

One study showed that availability of a free ambulance was a facilitator to using a health facility with SBA (King et al. 2015). However, there were several studies which reported lack of transportation as a barrier to attending health facility for delivery (Graner et al. 2010; Kruk et al. 2010; Kumbani et al. 2013; Phiri et al. 2014). The need for a good referral facility to higher health institutions was reported by several studies (Leigh et al. 2008; Graner et al. 2010).

3.3.7 Maintaining privacy and confidentiality

One study (Phiri et al. 2014) mentioned that health providers maintained privacy and confidentiality during childbirth at the health facility. Whereas five studies (Maimbolwa et al. 1997; Afsana and Rashid 2001; Kambala et al. 2011; Worku et al. 2013; Asefa and Bekele 2015) mentioned a lack of/or unsatisfactory practice for maintaining privacy and confidentiality, e.g. by exposing women during childbirth, leaving them naked or leaving

them to deliver under tree.

"In the labour room, the sisters removed my petticoat from the bottom. As I was trying to cover my private parts, they said that we were all women and there was nothing to feel shy about there. They asked, "Would you feel shy in front of us?" - (Women at health facility, Afsana and Rashid 2001)

3.3.8 Communication

There were five studies (Maimbolwa et al. 1997; Afsana and Rashid 2001; Delvaux et al. 2007; Phiri et al. 2014; Asefa and Bekele 2015) that reported a lack of communication which acted as a barrier for attending the facility. The issues reported were: getting inadequate information from providers, communication intensified during second stage of delivery, right to information and informed consent not adhered to, lack of information about progress of labour, and being absorbed with clinical aspects of delivery. There were some studies (Graner et al. 2010) which reported lack of communication from patients such as hiding their obstetrical history which made delivery of child difficult.

"Many pregnant women try to hide their obstetric history. I was sure that one pregnant woman had had obstetrical complications earlier, but she insisted on the opposite. Then I have to tell her that I am sure her previous deliveries were difficult, and she admitted to a complicated obstetrical history" - (Midwife, Graner et al. 2010)

3.3.9 Cultural and traditional values

A number of studies mentioned the preference for cultural and traditional practices as barriers to and causing difficulty in attending health facilities (Afsana and Rashid 2001; Pettersson 2004; Tucker et al. 2013; Phiri et al. 2014). Lack of acceptance by the indigenous population, endurance of pain during child birth, belief that strong women do not seek

institutional care, belief that being treated at health facility meant being sick and having defective body were some reasons for not attending health facilities for delivery. Some studies showed those facilities which supported cultural or religious practices tended to attract more women for delivery (Nikiema et al. 2010; Gyaltsen et al. 2014). It was seen that adherence to the cultural and traditional values was valued among people in communities and among those who attend health facilities in both urban and rural areas.

"…Because what happens is that as you are escorting her to the clinic, you find she delivers on the way. Then when you ask her what she took, she says her grandmother gave her something to drink so that she can quickly deliver" – (Traditional Birth Attendant, Phiri et al. 2014)

3.4 Discussion

Several factors were identified as major themes among the 28 selected studies which affect the quality of care of BEmONC facilities and midwife-led facilities in LMICs. These factors varied according to the country where the study was conducted, whether the study site was rural or urban, and the study participants. The factors are divided into facility level determinants of utilisation and factors affecting access to care based on the whether the factor was a characteristic of the birthing facility or arose from another source. The facility-level determinants were Phase III delays as classified by Thaddeus and Maine (1994) who identifies delays related to receiving adequate care at the facility and thus affect the provision and utilisation of high-quality obstetric care. In contrast, the factors affecting access to care were non facility-level determinants and were those related to Phase I delays (deciding to seek care) and Phase II delays (reaching an adequate health facility). These Phase I and II delays include various factors related to access to care which indirectly affect quality and utilisation of a health facility. The results of this review show there are several

studies about Phase III delays but fewer that focus on Phase I and Phase II delays. It is important to explore the cause of this difference.

3.4.1 Facility-level determinants

Availability of equipment and drugs was a major factor identified in a majority of studies which affected the utilisation of care at health facilities and ultimately the decisions of women and/or their families to attend such facilities based on the quality perception. The quality of health facilities providing maternal and neonatal care has been shown to be affected by a lack of required equipment and drugs as demonstrated by similar studies conducted in the past (Byrne et al. 2013).

Most of the remaining studies that did not mentioned availability of equipment and drugs as a factor affecting utilisation and finally quality of care were either located in urban areas or had a midwife as the attending health professional. Midwives play a crucial role in establishing a link between the natural and technical dimensions of birth. They develop close relationships with women and help establish a faithful attitude towards other health professionals (Andrissi et al. 2015). The presence of a midwife during labour and childbirth was viewed positively when that presence brought calmness, trust and safety to labouring women (Takemoto and Corso 2013). Maternity care provided in midwifery-led BC was found to be positive and as effective as consultant-led care in studies not only in LMICs (Rana et al. 2003; Jamas et al. 2013) but also in high-income countries like the United States of America (Johantgen et al. 2012, Sandall et al. 2016).

In health facilities where there was a lack of trained staff for maternity care and/or where midwives were seen to be working under pressure there was less time spent with each

woman leading sometimes to a lack of proper care. The resulting low quality of services available at such facilities was seen in similar studies (Onah et al. 2006; Byrne et al. 2013).

Similarly, the attitudes and behaviour of health care providers also had a high impact on the utilsation of delivery services. Women value how they are treated when they attend a health facility and did not like being treated rudely and shouted at (Kumbani et al. 2012). Disrespect and abuse was reported by numerous studies in this review which affected ratings of quality of care. Similar findings have been found in other studies from other low-income countries (D'Ambruoso et al. 2005; Bohren et al. 2014). Disrespect and abuse seen in the health system points to crisis of quality and accountability in health systems. Health systems that tolerate disrespect and abuse devalue women and contribute to the slow progress in reducing maternal mortality (Freedman and Kruk 2014). It is important to note that poor quality working conditions and lack of a caring environment experienced by care providers greatly influence the low quality of services provided (Mselle et al. 2013).

Maintaining privacy and confidentiality during delivery was considered a very important determinant in choosing the birthing facilities as it directly affected the quality of care perceptions of the users. This was also shown in other studies which identified privacy as an important factor in women's satisfaction of the delivery services they receive at health facilities (Srivastava et al. 2015).

Proper communication provided by health care professionals during delivery care was established as a factor that could improve the overall birthing experience of women. This review found poor communication during labour as a barrier to attending birthing facilities. Poor communication can adversely affect the quality of care provided by the health facilities and the decision of women to deliver at these facilities in future. The results of a similar

study found that women did not know the level of quality of care to expect because of the poor communication by the health workers (Kumbani et al. 2012). Proper health care provider-patient communication and provision of services in a client centred manner is seen as crucial if utilisation of services is to be maximised (Shiferaw et al. 2013).

In addition to the many barriers to facility level determinants of utilisation of care that were identified, there were a few facilitators thought to be helpful in attracting women to BEmONC facilities. When there was provision of emotional support, especially when family members were included (Afsana and Rashid 2001; Gyaltsen et al. 2014), when others expressed satisfaction with care they received (Duong et al. 2004; Philibert et al. 2014) and when there was trust in health providers (Kruk et al. 2009a), the quality of care was higher. Other studies have also reported that continuous support to women during labour and childbirth especially by family members was more likely to result in a shorter labour, spontaneous vaginal birth, reduced use of intrapartum analgesia and a more positive childbirth experience (Pascali-Bonaro and Kroeger 2004; Hodnett et al. 2007).

3.4.2 Factors affecting access to care

Besides the facility-level determinants there were other factors identified by this review which were classified under access to care determinants. A lower socio-economic status was a major barrier to utilising the birthing facilities in LMICs in our study. Other research confirms the existence of income inequality as a determinant of childbirth care that requires concerted new-equity oriented policies accompanied by further research to address this problem (Houweling et al. 2007). Increasing the number of skilled birth attendants among poor rural populations needs to be an area of focus (Houweling et al. 2007; Hajizadeh et al. 2014).

Women's position in society also plays a major role in determining their decision-making power related to pregnancy and childbirth. Similar to other studies (Glei et al. 2003; Adhikari 2015), our review found that women often had limited power to make decisions related to maternity care; their husband or other family members decided where birth would occur. Existing research shows that when women have a greater role in household decision-making, there is a higher level of institutional birth (Shiferaw et al. 2013; Adhikari 2015). One way of empowering and increasing women's roles in household decision making is by increasing educational status. Research has shown that women with higher educational status utilise facility delivery services more than their counterparts (Glei et al. 2003; Adhikari 2015).

As reported in other studies (Glei et al. 2003; Shiferaw et al. 2013) cultural and traditional factors were important in determining the uptake of delivery services by the family. Irrespective of whether the study site was urban or rural, cultural and traditional values were important when choosing the site of birth. Studies have shown that women often prefer home birth with traditional birth attendants because of their cultural values and the ability to maintain autonomy and receive supportive attendance while giving birth (Shiferaw et al. 2013; Bohren et al. 2014). Efforts to provide culturally appropriate, high quality care from qualified health personnel at birthing facilities could help increase the number of women seeking a facility-based delivery (Glei et al. 2003).

Having access to birthing facilities is also an important factor in their utilisation. The high urban-rural difference in maternal mortality could be addressed by improving access of rural populations to high quality services (Ronsmans et al. 2003). Researchers have stressed the

importance of improving access to maternity services in order to make delivery safer (Amooti-Kaguna and Nuwaha 2000).

The findings of this scoping review suggest that facility level determinants are only part of the overall set of influences on quality and utilisation of care in BCs. Factors that affect access to care must also be considered since they are barriers to utilisation of the available services. The conceptual framework of phases of delay as outlined by Thaddeus and Maine (1994) underscores our findings. A well-equipped and well-staffed health facility may still have a low quality of care because it is difficult to access, or the care is culturally insensitive, or it requires private payment. Phase I delays do indeed affect utilisation and therefore quality of care.

An important point to note is that the determinants of quality and utilisation of care in BEmONC and midwife-led facilities also applies to CEmONC facilities. Researchers have shown that shortages of personnel and supplies affect the quality of both BEmONC and CEmONC facilities (Otolorin et al. 2015). A lack of transportation was a barrier also at all levels of facilities (Austin et al. 2015). One study found that improving the quality of services offered by both BEmONC and CEmONC facilities required having new staffing models, a well performing and motivated workforce who provided interpersonal care, social support and, cultural safety (Das et al. 2014). This study also found that social support and specialised midwifery care throughout pregnancy, labour and the postnatal period provided reduced medical interventions during labour and resulted in a shorter length of stay.

The strength of this scoping review is that it combines results from qualitative, quantitative as well as mixed method studies. There are limitations of this review which need to be noted. First, we excluded studies in a language other than English and other unpublished

literature, which may mean important findings were missed. Secondly, although there were a few studies that included both primary and secondary level birthing facilities as study sites, we included results only from primary level birthing facilities. There is a possibility that we have included findings that applied to both levels of facilities. We acknowledge there were difficulties in the data synthesis process because of the variability of study designs and outcomes making it difficult to organise the results.

3.5 Conclusion

Due of the persistence of a high numbers of maternal deaths in LMICs, especially in sub-Saharan Africa and South Asia, several strategies have been developed to address this problem, including attendance at every birth by a SBA and directing every woman to receive care in a BEmONC or CEmONC facility. However, poor quality maternal care continues to remain a major contributor to maternal deaths worldwide and especially in LMICs. This scoping review examined factors affecting utilisation and access to care in BEmONC and midwife-led facilities in LMICs. Two categories of factors emerged: facility-based factors and access to care factors. The facility level factors were directly related to the services and providers. We further identified facilitators and barriers within this category. Within the category of factors affecting access to care were broad social-cultural and environmental issues that affect quality of care. Often the focus of quality improvement is on facility-level factors, however improved service utilisation at BEmONC and midwife-led facilities depends greatly on addressing factors that influence access to care.

3.6 Chapter summary

This chapter explored on the need for conducting a scoping review related to utilisation and access to care of BEmONC and midwife-led facilities, the process how it was done, the

results and discussion about the associated factors and finally the conclusion. The important findings of this scoping review revealed that there are both ‘facility level’ and ‘access to care’ determinants that affect utilisation and quality of care. Thus, it is implied that while endeavouring to improve the quality of care, important consideration is needed on how to address both the ‘facility level’ and ‘access to care’ determinants with equal importance. This section leads to next chapter on methods and methodologies which explains details about the theory and methods used to explore the objectives of this doctorate study.

Table 4: Characteristics of the studies selected for review

Reference	Methodological approach	Country of study	Study setting	Health facility setting	Study sample (relevant to study)
Philibert et al. 2014	Quasi experimental with intervention and control group	Burkino-Faso	Rural	Health and social promotion centres (PHCC)	Women - at health, social promotion centres (569 in intervention and 301 in control group)
Phiri et al. 2014	Qualitative, (interviews)	Zambia	Rural	20 public health facilities	5 women with home birth, 5 husbands of women - previous home births, 5 - community leaders, 5 traditional birth attendants & 5 health providers
Kruk et al. 2009	Cross-sectional survey, (questionnaire)	Tanzania	Rural	Health centres or government dispensaries	1205 women who completed questionnaire
Graner et al. 2010	Qualitative, (focus group discussions)	Vietnam	Rural	Communal health stations	21 midwives
Karkee et al. 2015	Prospective cohort study	Nepal	Rural	Birth centre	353 women - birth centre
Mainbolwa et al. 1997	Descriptive survey study, (observation)	Zambia (Southern Province)	Urban+rural	Health centres and hospitals	30 births - urban health centres & 24 - government &

Reference	Methodological approach	Country of study	Study setting	Health facility setting	Study sample (relevant to study)
					mission hospitals
Kumbani et al. 2013	Qualitative, (face to face in-depth interviews)	Southern Malawi	Rural	Catchment area of Namadzi health centre	12 women – gave birth at home
King et al. 2015	Qualitative, (questionnaires, interviews and focus group discussion)	Ethiopia	Urban+ rural	Health posts	14 health extension workers, 33 women & 8 other health workers
Walker et al. 2013	Cluster randomized trial, (medical charts, interviews)	Mexico	Rural	PHCC	12 intervention & 15 control sites, midwives and obstetric nurses, women - gave birth at health centre
Asefa and Bekele 2015	Quantitative, cross-sectional, (interviewer administered questionnaire)	Ethiopia	Urban	3 catchment health centre	93 women - 3 catchment health centres
Larson et al. 2014	Cross-sectional, (questionnaire-based survey)	Tanzania	Rural	24 dispensaries and served villages	855 women – gave birth at study facilities
Tucker et al. 2013	Mixed method (in-depth	Mexico	Urban + rural	Birthing house –	7 Traditional birth

Reference	Methodological approach	Country of study	Study setting	Health facility setting	Study sample (relevant to study)
	interview, focus group discussion, structured interviews)			Casa Materna adjacent to a hospital	attendants, 3 women from community & 11 health personnel
Kruk et al. 2014	Cross-sectional survey, (structured interview)	Tanzania	Rural	24 primary care clinics	319 women
Mezie-Okoye et al. 2012	Cross-sectional facility-based survey (semi structured questionnaire)	Nigeria	Rural	10 PHCC	Heads of health facilities
Karkee et al. 2014	Prospective cohort study	Nepal	Rural	BC	547 postpartum women with 5 months or more gestation
Kambala et al. 2011	Qualitative (focus group discussion)	Malawi	Rural	Catchment area of 3 health centre	140 - community leaders, men, women, boys & girls
Nikiema et al. 2010	Cross-sectional quantitative (observation and semi-structured questionnaire)	Burkino Faso	Rural	22 PHCC	22 PHCC & observation of 81 antenatal consultations

Reference	Methodological approach	Country of study	Study setting	Health facility setting	Study sample (relevant to study)
Leigh et al. 2008	Mixed method (review of facility registers, observations and interview)	Malawi	Rural	94 health centres	25% (94) of Malawi's 374 health centres
Patterson 2004	Qualitative (descriptive and explorative)	Angola	Urban	Peripheral delivery units	11 midwives and 48 women in community
Kruk et al. 2009	Discrete choice experiment	Tanzania	Rural	---------	1205 participated in full survey and 1203 completed the module
Therese et al. 2002	Cross-sectional quantitative (observation checklist and semi-structured questionnaire)	Cote d'Ivore	Urban	3 health centres	229 deliveries
Worku et al. 2013	Cross-sectional facility and population-based survey	Ethiopia	Rural	12 health centres	538 women eligible for antenatal care and 231 women eligible for delivery care
Mackeith et al. 2003	Community based survey (questionnaire)	Zambia	Urban	Health centres	1210 women - pregnant in previous two calendar years

Reference	Methodological approach	Country of study	Study setting	Health facility setting	Study sample (relevant to study)
Afsana et al. 2001	Qualitative (in-depth interview, participant observation, focus group discussions and informal discussion)	Bangladesh	Rural	1 health centre	15 women - gave birth at health centre, 5 women - gave birth at home, informal discussion with 4 physician & 7 other female paramedics
Duong et al. 2004	Mixed methods (questionnaire, focus group discussion and in-depth interview)	Vietnam	Rural	Communal health centre	85 women - delivered at health centre & 98 women - delivered at home. Focus group discussion (FGD)s - women, mother-in-laws & husbands, in-depth interviews with providers, TBAs &women union activists
Parkhurst et al. 2003	Cross-sectional quantitative	Uganda	Rural	Health centres	13 health centre & 2 health centre

Reference	Methodological approach	Country of study	Study setting	Health facility setting	Study sample (relevant to study)
Kruk et al. 2010	Discrete choice experiment	Ethiopia	Rural	---------	1006 rural women & gave birth past 5 years
Gyaltsen et al. 2014	Mixed method (survey and focus group discussion)	Tibet (China)	Rural	Birth centre	114 women - birth at BC and 108 in same community but who had not given birth at BC

CHAPTER 4 Methodology & Methods

This chapter will explain the methodology and methods used for this longitudinal mixed-methods study. Starting with an introduction to the chosen methodology and providing the rationale for using mixed-methods, the methods used in the study are then detailed. Finally, the remaining sections address ethical approval and the strengths and weaknesses of the study design. The aims and objectives of this mixed-methods study are listed in Sections 2.11-2.12. These aims and objectives were formulated according to the demands of the research question in Section 2.10.

4.1 Methodology for using mixed methods

The classical view of scientific inquiry was inductive, which is a systematic procedure for analysing qualitative data where the analysis is guided by specific objectives (Thomas 2006). Three features that distinguish this approach are: firstly, statements that cannot be falsified are not scientific. Thus, declaring an unfalsifiable theory to be scientific would be pseudoscience. Secondly, science is both rational and critical where the null hypothesis works; thirdly, it assumes a scientific mindset already informed with theories, networks and models before engaging in observation and science. Kuhn (1970) in *The Structure of Scientific Revolutions* describes science as working within a ‘paradigm, id est (i.e) a framework of meaning and procedures that determines the selection of data and their interpretation.

It would be difficult to assess the relationship between social and natural sciences and their objects if practice is reduced to knowledge, knowledge to science and science to observation and contemplation. Knowledge never develops in a vacuum but is always embedded in social practices and knowledge can be better understood within the context of social

practices. In understanding epistemology or the theory of knowledge, it has been said that the world can only be understood in terms of available conceptual resources. However, conceptual resources do not determine the structure of the world itself. Observation is neither theory-neutral nor theory-determined, but theory-laden (Sayer 1992). Truth is neither absolute nor purely conventional and relative, but a matter of practical adequacy. Theory does not order given observations or data but negotiates their conceptualisation, even as observations (Sayer 1992).

According to Creswell (2014, p. 35), a philosophical worldview underpins any research and is defined as "a basic set of beliefs that guide action". The worldview is also known as paradigms, epistemologies and ontologies or, broadly conceived, research methodologies. These worldviews are a general orientation a researcher holds about the world and the nature of research (Creswell 2009).

There are two important and distinct methodologies or paradigms: the positivist or post-positivist paradigm and the constructivist or naturalistic paradigm (MacKenzie et al. 2014). According to the positivist paradigm, nature is an ordered and complex phenomenon best understood by reducing it to basic quantitative parts and is based on objectivism and rational and scientific assumptions (Tashakkori and Teddlie 2010). The post-positivist paradigm is a revised form of positivist paradigm that addresses several of the more widely known criticisms of the quantitative design but still maintains an emphasis on quantitative methods (Teddlie and Tashakkori 2009). Quantitative research is usually designed to test *a priori* hypotheses and begins with predetermined, instrument-based questions (Testa et al. 2011). A second methodological approach, called the constructivist or naturalistic paradigm, emerged to address the 'how' and 'why' questions. In contrast to quantitative methodology,

qualitative research typically involves a naturalistic or holistic collection of data, usually through interviews or observations (Testa et al. 2011). This paradigm is based on social constructions and relativism and contends that reality is shaped by the individual and the culture rather than being absolute (Downe and McCourt 2004). Answers to quantitative research questions are presented in numerical form and the data analysis is the analysis of numerical data using techniques that include (a) describing the phenomenon of interest; or (b) looking for significant differences between groups or amongst variables. Answers to qualitative research questions, on the other hand, are in narrative form. Qualitative data analysis is the analysis of narrative data, typically resulting in themes (Teddlie and Tashakkori 2009). The post-positivist worldview, usually begins with a guiding theory and the study is delimited to certain variables that are empirically measured and observed, such as in using a survey as a research tool (Creswell and Plano Clark 2010). The constructivist worldview as used in interviews and focus groups, usually serves to explain the results of surveys and elicit multiple meanings from the participants in order to build a deeper understanding than survey results might convey (Creswell and Plano Clark 2010). A need for a third methodological approach to serve as a bridge between qualitative and quantitative research based on post-modernism or pragmatism is fulfilled by mixed-methods research (Tashakkori and Teddlie 2010).

This research adopted a pragmatic worldview to conduct the study. Pragmatism as a worldview arises out of situations, actions and consequences rather than antecedent conditions. Here the researcher emphasises the research problem and uses all approaches available to understand the problem, so the focus is on the research problem rather than the methods. Tashakkori and Teddlie (2003, p. 713) defined pragmatism as: “a deconstructive paradigm that debunks concepts such as ‘truth’ and ‘reality’ and focuses instead on “what

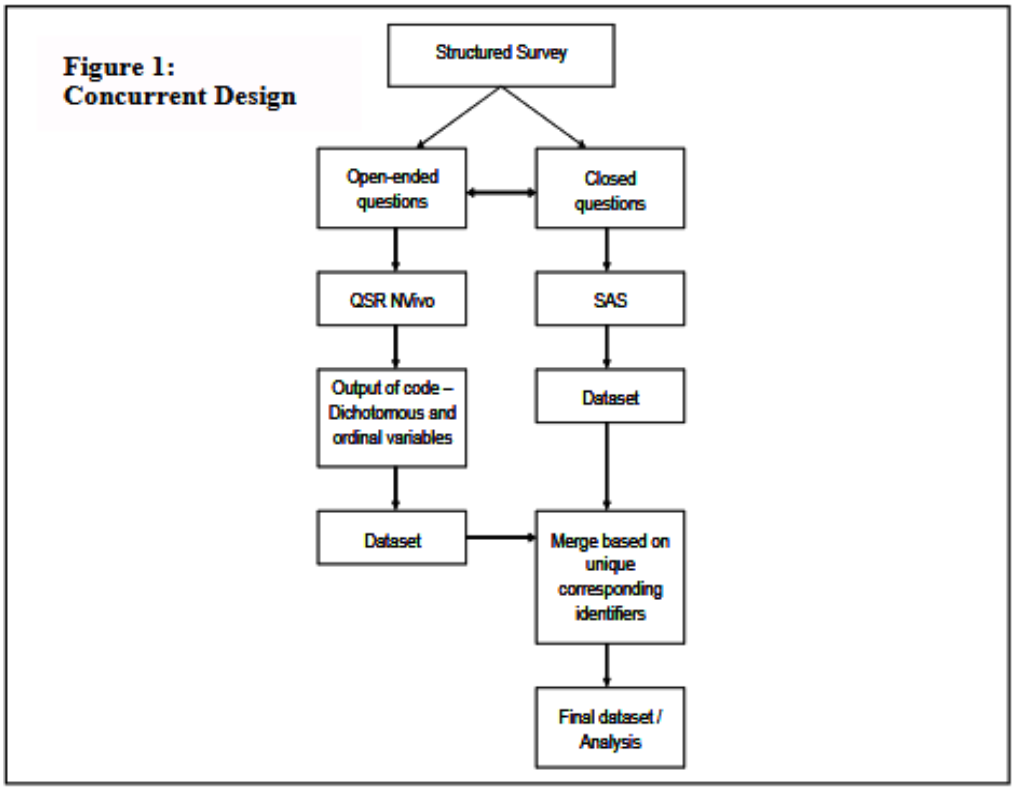
works" as the truth regarding the research question under investigation. Pragmatism rejects the either/or choices associated with the 'paradigm wars', advocates for the use of mixed methods in research, and acknowledges the values of the researcher who plays a role in the interpretation of results".

Mixed-methods research is widely used by researchers as a pragmatic method to conduct research into education and health. It involves using both quantitative and qualitative research methods, and at some point integrating the two forms of data/findings (Steckler et al. 1992). Researchers use mixed-methods research as it gives a more comprehensive insight into a research problem than can be provided by a qualitative or quantitative approach alone. Mixed-methods research is often referred to as 'pragmatic' as it applies two research approaches that have distinct designs and are underpinned by different philosophical/theoretical constructs (Creswell and Plano Clark 2010). According to Rossman and Wilson (1985), the pragmatic mixed-methods approach and accompanying worldview arise out of researchers' emphasis on the research problem and use all approaches available to understand the problem. The history of this approach as a new methodology dates back to the late 1980s based on work in such diverse fields as sociology, health sciences, management and education (Creswell 2014).

The mixed-methods research question guides the choice of methods and is answered with information that is presented in both narrative and numerical forms (Fetters et al. 2013). The data analysis of this design involves integration of statistical and thematic data analysis techniques and the investigator has to go back and forth seamlessly between statistical and thematic analysis for interpretation (Teddlie and Tashakkori 2009).

This doctorate research used concurrent parallel mixed-methods design where both quantitative and qualitative data were collected, and the results merged using an all-encompassing worldview (Creswell and Plano Clark 2010). This helped to identify and compare different perspectives drawn from qualitative as well as quantitative data. Concurrent mixed-method strategies were employed to validate one form of data with the other, to transform the data for comparison and to address different types of questions (Creswell and Plano Clark 2007). Figure 7 shows an example of mixing methods.

Figure 7: Concurrent design

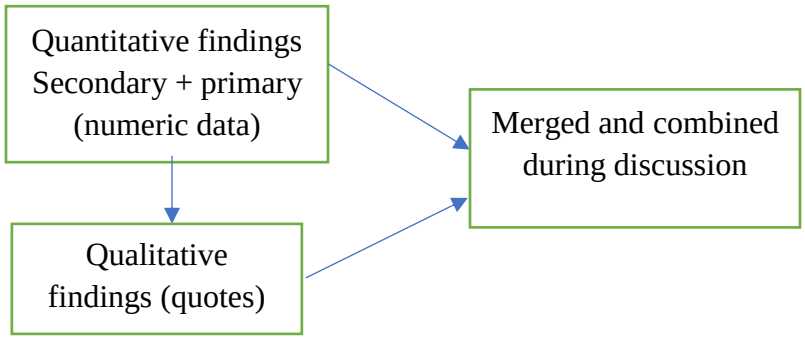


QSR NVivo and SAS – Data analysis software used for qualitative and quantitative analysis respectively (adapted from Driscoll et al. 2007).

The concurrent design is sometimes also called as convergent design, and it best suits this research since efficient data collection and analysis for both the quantitative and qualitative

data occurs during a similar time frame (Fetters et al. 2013), thereby reducing the number of visits to the research site. A further advantage of concurrent design is that the collection and analysis of embedded qualitative responses can augment and explain complex or contradictory survey responses (Driscoll et al. 2007). However, the integration of the results was done sequentially, as presented in the Discussion (Chapter 7), where the quantitative and qualitative results were discussed separately before being integrated. The quantitative statistical data were followed by qualitative results which either supported or refuted the quantitative findings. The quantitative findings included the secondary data from pre-intervention analysis and combined pre- and post-intervention survey analysis data. The qualitative data mostly consisted of the themes and quotes generated from the analysis of interviews and focus group discussions. In the Discussion chapter both sets of findings were brought together, merged and reported (Figure 8). These were further discussed in the light of the existing literature.

Figure 8: Combining of analyses in the discussion



4.1.1 Rationale for using mixed-methods study

A mixed-methods approach has become popular in health research for two main reasons: firstly, it combines both quantitative 'how many' question and qualitative 'why' questions; secondly, the use of mixed methods provides stronger inferences and the results of each can validate the other. This allows the researcher to gain insight into problems from different

perspectives and address complex health problems from a broader and more practical perspective (Morgan 1998; MacKenzie et al. 2014). One of the practical strategies in combining these two methods is to designate one method as the principal which is supported by another complementary method. This division of labour is based on the recognition that different methods have different strengths. The decision to choose either quantitative or qualitative methods as the principal and complementary approach depends on the research aims and objectives (Morgan 1998).

The aim of this convergent parallel mixed-methods study is to evaluate the effects of an intervention on increasing access and utilisation of perinatal care facilities in community settings. In the study, quantitative instruments were used to assess utilisation of BCs and evaluate changes in perinatal care facilities available after the intervention of supporting BCs and providing health promotion messages. At the same time, a qualitative approach was used to assess the quality of care of services available at BCs, including views from health care providers as well as mothers' uptake of such services. The reason for combining both quantitative and qualitative data was to better understand the quality of care by converging quantitative data about the correlated factors and state of maternity care as well as qualitative data which took into account the views of both mothers and health care providers. An account of using mixed-methods in the health field and how it was used in this doctorate research has also been published as a research paper (Mahato et al. 2018c) (Appendix I.7).

In this study quantitative methodology is used as the principal approach and it is supported by using complementary qualitative methodology, which adds strength by explaining the results of the quantitative methodology. To summarise, the quantitative methodology assesses the changes in perinatal care facilities available after the intervention in this project,

whereas the qualitative methodology explains the reasons why the services offered by the BCs are utilised or not utilised by exploring the factors affecting quality of care.

Research has shown that mixed methods evaluation can contribute to new knowledge on the effectiveness of care-seeking behaviour in maternal health in LMICs (Sharma et al. 2017). The findings of such research can also assist government bodies in producing health promotion evaluation curricula for training health staff working in rural areas in order to improve maternal and newborn health (Sharma et al. 2017).

4.2 Mixed methods in this thesis

The main aims and objectives of this study are stated in Sections 2.11 and 2.12. To fulfil these aims and objectives, this research used a mixed-methods approach, which is a pragmatic way to answer questions related to change in various characteristics and services after interventions by using quantitative methods; the qualitative methods then explained the reasons for this change. In the following sections, more about individual methods are explained as:

- quantitative: (a) surveys; (b) comparative pre- and post-intervention analysis; and (c) multinomial regression analysis;
- qualitative: (a) interviews; and (b) focus group discussions.

Further in this chapter, an account of the way in which this mixed-methods study was conducted and evaluated will be provided. In addition, details on study design, study area and population, sampling frame, sample size, data collection tools, analysis and interpretation will also be provided.

4.2.1 Mixed-methods research and evaluation

This was an exploratory study to evaluate the changes that occurred after an intervention and to investigate the perspectives, perceptions, and personal experiences of key actors involved with the operation and use of perinatal care facilities from BCs. Interviews were conducted with women in the community and health workers whereas for the focus group discussion, only the women in the community were approached. This mixed-methods study was conducted in three phases:

1. **Baseline survey**

   This was conducted in 2012 by GTN. Data from this survey was made available to the researcher, a part of which was used for this longitudinal study in order to conduct the pre-intervention survey analysis. (Chapter 5). More detail on the differences between the baseline survey and pre-intervention survey is provided in Section 1.9.

2. **Post-intervention survey**

   This was conducted in 2017 by the researcher (Chapter 5).

3. **Qualitative study**

   This was conducted at the same time as the post-intervention survey by the researcher (Chapter 6).

4.2.1.1 Evaluation

The evaluation of this mixed-methods study was conducted sequentially, where the quantitative surveys and qualitative interviews were merged during discussion, although the data collection was conducted in parallel. Mixed-methods were best suited for this research where the former quantitative methods collected data on uptake of BCs. The latter qualitative methods explored the views of women and healthcare providers regarding

services available at these BCs. This mixing of methodologies, in this case the mixing of two surveys with thirteen interviews and one focus group discussion, is a more profound form of triangulation (Olsen 2004). In this study, the quantitative findings were presented in tables, whereas the qualitative findings were presented as themes and tables.

4.2.2 Study design

There are two types of quantitative research designs: experimental and non-experimental study designs. Experimental design involves the introduction of some variables, such as treatment, and comparing the outcome with a control group which has not received the treatment. Non-experimental study designs involve data collection from existing groups. For example, to look at the relationship between a number of variables such as identifying the type and frequency of diseases in a specific group of people (descriptive) or determining why a particular group is affected while another is not (analytical) (Meadows 2003). This research is a non-experimental study where changes in perinatal health care facilities were evaluated in the community using a pre and post-intervention comparison. The change was measured in variables such as a change in birthplace. The data were collected through structured questionnaires administered in two surveys in different years.

This longitudinal study was conducted over a period of five years. The effects of an intervention, supporting two BCs: Thulo Khairtawa and Narsahi and providing health promotion messages, was measured in this study (Section 5.2). Longitudinal studies often employ continuous or repeated measures to follow particular individuals over prolonged periods of time- often years or decades. These are generally observational in nature with data being collected quantitatively and/or qualitatively on any combination of exposures and outcomes (Caruana et al. 2015).

One of the main benefits of a longitudinal study is that it provides an understanding of the degree and direction of change. This is usually lacking in cross-sectional studies, which analyse multiple variables at a given instance, but provides no information with regards to the influence of time on the variables measured (Caruana et al. 2015). There are different types of longitudinal study designs: repeated cross-sectional study; prospective studies which again consist of cohort panels, representative panels and linked panels; and retrospective studies. This doctorate study used a repeated cross-sectional study where the study subjects were largely or entirely different from each other on each sampling occasion, but the area of study was the same (Caruana et al. 2015). The area needed to be the same to make the variables comparable on repeated measurement points, but the study subjects could be different as the sampling was done in a different time-frame, but with the same inclusion criteria. To clarify this, the inclusion criteria for the survey were: women in the reproductive age group (15-49) who had at least one child under 24 months of age. Based on these inclusion criteria, it is highly likely that the women were largely or entirely different on each sampling occasion.

4.2.2.1 Reasons why this is a longitudinal study

Studies using multiple sources of data (data collected at different time points) can be a valuable source for determining empirical regularities and can be used to investigate social change (Gayle and Lambert 2018). Example of such studies can be comparing cross-national surveys where data are collected at different time periods; this is used for longitudinal studies. Such repeated cross-sectional surveys can be used to investigate longer term social trends and also has a benefit that logistic regression models can be used for analysis. However, it must be used carefully in order to make surveys sufficiently equivalent over time in order to allow realistic comparisons (Gayle and Lambert 2018).

A pre-intervention survey was carried out, followed by simultaneous collection of data for the post-intervention survey and qualitative methods, including interviews and focus groups. A flow chart for this longitudinal (repeated cross-sectional) study is illustrated in Figure 9.

Figure 9: Flow chart illustrating longitudinal study design

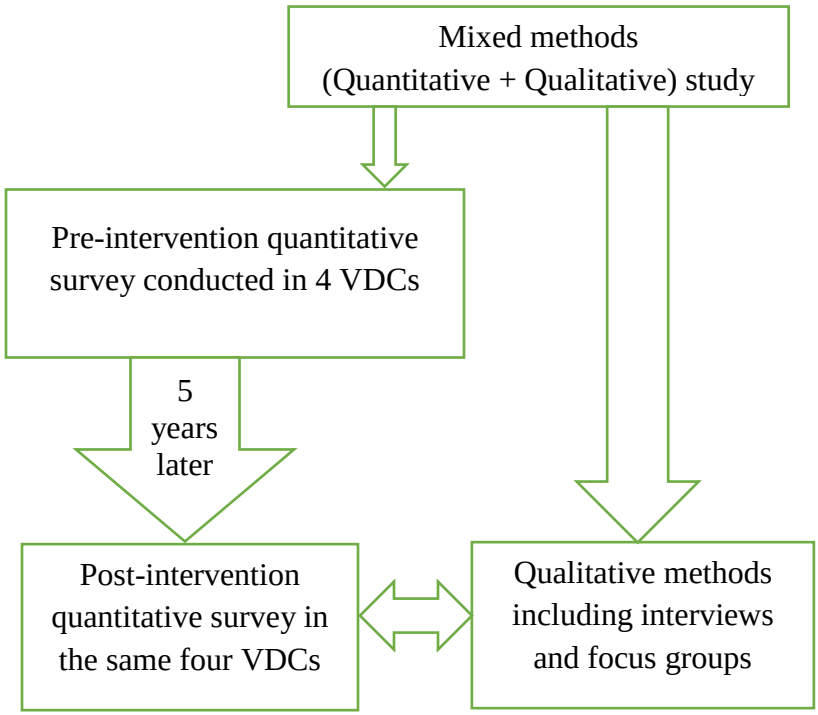


Figure 9 shows the longitudinal study design with the pre-intervention survey conducted initially, followed by a concurrent parallel mixed-methods data collection stage, including the post-intervention survey and accompanying qualitative element.

4.2.3 Study area

The study was conducted in the western development region of Nepal. The western region has 16 districts located in three geographical regions. Three BCs located in the intervention site of Nawalparasi district were selected. Two BCs were supported by GTN but the third was run with government support, with some instruments donated by some NGOs. The Nawalparasi district was selected because of (a) being a poorer part of Nepal and (b) the fact

that it has both the plain as well as hilly areas, which makes it unique in Nepal. Although Nawalparasi is a Terai district mostly composed of plain lands, the northern part of the district lying in close vicinity to Tanahu and Palpa district is composed of mostly hilly areas (District Coordination Committee Office Nawalparasi 2017).

4.2.4 Study population

The study population consisted of mothers living in rural villages of the Nawalparasi district in the catchment area of the BC facilities, as well as health care workers (ANMs and public health nurses) working at the BCs or the DPHO. These women were chosen since they are the key actors for the research and because they had utilised the services available at BCs in the past or might need them in the future.

4.2.5 Sampling

Sampling is a process or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of the whole population (Meadows 2003). Sampling differs for qualitative and quantitative research.

4.2.5.1 Sampling method used for quantitative study

Population-based multi-stage sampling of women of reproductive age and having children below 24 months was undertaken for both the pre- and post-intervention survey.

For sampling purposes, the eligible participants from each household of the selected VDCs, who had agreed to take part were approached by trained enumerators (Section 4.3) and a structured questionnaire was completed by these enumerators. In order to conduct the baseline survey, three enumerators were trained and mobilsed for data collection and entry. These enumerators had at least a degree level qualification in a health-related subject. For

the post-intervention survey, eight enumerators and two data assistants having at least a degree level qualification in a health subject, were trained for two days. Training included going through each question in the survey questionnaire and explaining them. Any queries or confusion regarding the questions on the part of data enumerators and data assistants were clarified during the training. Women who met the inclusion criteria were then approached to complete the structured questionnaire.

4.2.5.2 Sampling method used for qualitative study

For the qualitative research, purposive sampling was used to identify the BCs, a mix of government funded and NGO supported, highly and poorly performing BCs, receiving more women versus less women for childbirth per year, remote access versus easy access (by ambulance) to BCs in Nawalparasi. Initially it was planned that if more data was necessary, another hilly district would also be selected based on feasibility and practicability. Three to five BCs in the Nawalparasi district were to be included in this research but due to limitations of time and resources, only three BCs were selected based on whether they were supported by non-governmental organisations or by the government. Non-random sampling (purposive sampling) was used for the qualitative phase because of the design, aim and objectives of this study.

4.2.6 Sample size

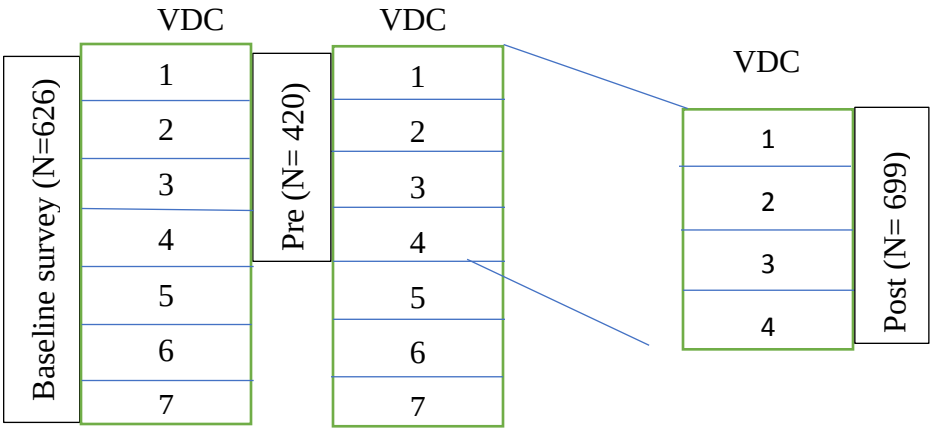
4.2.6.1 Sample size used for quantitative study

A quantitative household survey was conducted for both pre- and post-intervention. A baseline survey using seven VDCs was included, with a total of 626 participants. However, only the results from the four VDCs were included in the pre-intervention survey and included a total of 420 participants. However, the baseline survey was initially analysed

using data from seven VDCs and published as an academic paper (Mahato et al. 2017) (Appendix I.4).

As the quantitative survey is based on a total household survey, the sample size depended on the number of households in the VDCs and the availability of female participants who agreed to take part in the survey. The post-intervention survey was conducted in four VDCs and the total participants was 699. The researcher recruited a larger sample second time around to allow for more detailed analysis of sub-populations. The post-intervention survey had more participants to ensure that the sub-populations could be compared and linked with the qualitative results. Figure 10 depicts the change in sample size.

Figure 10: Change in sample size from pre- to post-intervention survey



4.2.6.2 Sample size used for qualitative study

For the qualitative phase, three BCs from the Nawalparasi district were purposively selected. Women and health care workers were also purposively selected for interviews and focus group discussions. The number of interviews and focus group discussions with women in community and health care workers varied depending on participants' availability and time. The participants for focus groups were selected purposively and using the snowball technique (Noy 2008) and help from ANMs to identify potential participants. These

participants in turn identified other women from the community, who were included for the discussion after consent. An effort was made to contact the selected participants a second time for example if the ANMs were not present at the BCs, the researcher went to the BC second time and if the participant was not available they were not contacted again. The researcher collected data according to the principles of saturation, i.e when participants stopped giving further new ideas or information (Saunders et al 2017).

4.2.7 Development of data collection tools

Data collection tools were developed to fulfill both the qualitative and quantitative objectives. For the quantitative part of the study, a validated questionnaire (Sharma et al. 2016) was used to capture the socio-demographic and socio-economic characteristics of the women as well as their maternal and obstetric characteristics. The questionnaire was administered face-to-face to collect information related to birth at health facilities and the associated factors. The questionnaire was adapted from the Nepal Demographic and Health Survey; Water and Sanitation Survey and from wider literature. The questionnaire was originally developed in English but was later translated into Nepali (Appendices C and D). A similar version of this validated questionnaire had been used elsewhere (Sharma et al. 2016).

For the post-intervention survey, a few changes were made to the questionnaire including removing questions related to socio-demographic characteristics. This modification was necessary based on revision of the questionnaire and experience with using the pre-intervention survey questionnaire. This also helped remove unnecessary questions that only increased the time taken to complete the questionnaire.

For fulfillment of the qualitative objectives, an interview schedule for interviewing both the women in the community and health care providers as well as questions for focus group discussions was developed (Appendix E).

4.2.8 Pre-testing of data collection tools

The pre-intervention survey questionnaire had previously been validated in the Nawalparasi district (GTN 2012). The pre-testing of the post-intervention survey questionnaire was done by the Ph.D. researcher in VDCs in the Nawalparasi district prior to conducting the main survey. This pre-testing was necessary to determine the appropriateness of the questionnaire; if the questions were clear enough for the data enumerators who conducted the survey and to the respondents who took part in the survey and also to find how long it took to complete one questionnaire. Based on the pre-testing results, the questionnaire's wording and content were adapted. Qualitative instruments were continuously assessed and improved if required throughout the research process.

4.2.8.1 Quantitative survey

This study used a non-experimental study-design which used repeated cross-sectional studies conducted over a five-year period and where the data collection was undertaken in a specified area. The research methodology is further discussed in Section 4.2.2.

Surveys are one of the most common ways of collecting information in quantitative studies which uses tools such as self-completion questionnaires, face-to-face interviews or tests and scales (Labaree 2019). A quantitative survey approach focuses on quantitative analysis, where data are collected from a number of individuals using a systematic and standardised approach such as questionnaires, structured interviews, and telephone interviews or from published

sources, followed by analysis of these data using statistical techniques. A representative sample of a study population is studied, and the analysis provides generalisable statements about the aims and objectives of the study (Gable 1994; Labaree 2018). The major limitation of a survey study is that it only provides a snapshot of the situation at a certain point of time and may not provide the underlying meaning of data. For example, a cross-sectional study does not provide strong evidence of cause and effect (Gable 1994). There are some requirements of conducting a good survey, whether small or large, which are:

- The objectives of the survey must be specific and measurable
- The data are usually gathered using structured research instruments.
- The sample population studies must be appropriate or representative
- The questionnaires, scales and tests used must be reliable and valid
- The most appropriate analysis must be applied to meet the objectives
- Findings must be reported accurately, and the study should be replicable

(Labaree 2018).

There are different ways in which questionnaires can be administered in a survey: (a) self-completion; (b) face-to-face interview; and (c) telephone or online interviews. For this doctorate study, face-to-face interviews were undertaken, where a structured questionnaire was completed by trained data enumerators after asking questions to the interviewee. This was done because the respondents were mostly illiterate or not educated to the level where they would be able to fill the questionnaires by themselves.

For the baseline survey, 631 women were approached. The data enumerators intended to include all eligible people, however three declined (the non-response rate was less than 1%) and two were withdrawn after data cleaning, leaving 626 in total. Of these 626, data from only 420 participants from four VDCs were used in this pre-intervention analysis (as explained in Section 4.2.6.1). The pre- and post- surveys took place in 2012 and 2017 respectively. Details of each survey are provided below:

4.2.8.1.1 Pre-intervention survey

Seven VDCs were identified as the most vulnerable and disadvantaged, based on the Disadvantage Group (DAG) mapping by the Nawalparasi District Development Committee for the purpose of a baseline assessment survey. This survey was conducted in seven VDCs, however for the pre-intervention survey, only data from four VDCs were used. The reasons for only including four VDCs for the pre-intervention survey analysis are provided in Section 1.9.

The study participants were women of reproductive age (15-49 years) having at least one child below 24 months of age. The pre-intervention survey aimed to establish the socio-demographic, socio-economic, maternal related and other factors affecting birthplace and the state and quality of maternity and childbirth services offered by the health facilities, especially the BCs.

In the initial stage, descriptive analysis was carried out. Results obtained by descriptive analysis provided a summary of general characteristics such as socio-demographic, socio-economic, health services, obstetrics and maternal characteristics of the participants. The primary outcome for analyses originally was birth at BCs and secondary outcome included number of ANC, women's decision making about place of birth and satisfaction with

childbirth services. In this thesis, the primary outcome changed to place of birth consisting of various categories such as home, primary care facilities including BCs and tertiary care facilities. This became clear when trying to conduct chi square and regression analysis as the descriptive findings of survey analysis showed that the data related to place of birth consisted of three categories as mentioned above. The chi square test of association was performed between birthplace as the outcome variable and the other previously mentioned characteristics as dependent variables (details about outcome and dependent variables are provided later in this section). Those variables which showed a significant association with the outcome variable were included in regression analysis.

Before conducting the analysis, variables were recoded into appropriate categories. For the regression analysis, the outcome variable i.e. birthplace was categorised as (a) home/on way; (b) primary care facilities; and (c) hospitals/clinics. The category 'primary care facilities' included BCs and PHCCs and the category 'hospitals/clinics' included all public and private hospitals, although some private clinics may have been included in this group. These two groups presented here in the pre-intervention survey could not be changed as these were grouped by the researchers involved in the baseline survey and the data were available to the researcher as secondary data. The dependent variables were based on previous literature on the determinants of institutional birth and also on the secondary analysis of the pre-intervention survey. The dependent variables included in regression analysis comprised all the variables which showed a significant association in chi-square test of association. The reference categories chosen for regression analysis were for convenience reason always the last category.

The socio-demographic and socioeconomic characteristics included age of the women, caste, religion, literacy, occupation, husband's education, husband's occupation, women's literacy, electricity at home, radio at home, television at home, roof material of the house, ownership of motorcycle or scooter and land owned in '*Katha'*. One '*Katha*' of land is equivalent to 720 square feet (Hossain 2017). Health services, obstetric and maternal characteristics included time to reach a health centre, the decision maker for the place of birth, the birth attendant, financial assistance for childbirth, age at first pregnancy, total number of pregnancies, timing of first pregnancy, planning of last pregnancy and frequency of antenatal check-up.

4.2.8.1.2 Post-intervention survey

The post-intervention survey was conducted in January and February 2017 in four VDCs and as for the pre-intervention survey, in the BCs' catchment area. The post-intervention survey aimed to investigate the effects of supporting BCs and providing health promotion messages (the intervention) on the uptake and utilisation of services available from these BCs. The questionnaire used for the post-intervention survey was modified based on experience with conducting the pre-intervention survey, as detailed in Section 4.2.7.

Similar to the pre-intervention survey analysis, variables were recorded into appropriate categories. Since one of the objectives of this study was to evaluate the changes in perinatal health care facilities available before and after intervention, the analysis of the post-intervention survey was done in comparison with pre-intervention data. This was necessary in order to find differences occurring due to intervention as explained above.

At the initial stage, descriptive analysis was carried out for both surveys. The primary outcome for analyses originally was birth at BCs and secondary outcome included number of ANC,

women's decision making about place of birth and satisfaction with childbirth services. In this thesis, the primary outcome changed to place of birth consisting of various categories such as home, primary care facilities including BCs and tertiary care facilities. This became clear when trying to conduct chi square and regression analysis as the descriptive findings of survey analysis showed that the data related to place of birth consisted of three categories as mentioned above. The chi square test was conducted to identify associations between the dependent variables in the pre- and post-intervention surveys. The chi-square test was used to see if two categorical variables forming a contingency table were associated. In simple language, it tested if there was any relationship between two categorical variables (Field 2013). After this, cross tabulation of the pre- and post-intervention survey, with intervention as the outcome variable and socio-demographic, socio-economic, obstetric and maternal characteristics as dependent variables were performed individually to see which variables showed statistically significant results. The strength of association was reported using Cramer's V and the strongest association found within the variables was reported using adjusted residuals. Cramer's V is a measure of the strength of association between two categorical variables if the contingency table is larger than 2 x 2. Cramer's V is an adequate effect size as it is constrained to fall between 0 and 1 and is therefore easily interpretable (Field 2013). The effect size of Cramer's V can be weak, medium and strong based on the value which also depends upon degrees of freedom (Cohen1988). In this study, Cramer's V was used to report if the association was weak, medium and strong; and this was further supported by the results of adjusted residuals.

Additionally, multinomial logistic regression and univariate logistic regression were also conducted to establish the associations of various characteristics (including intervention) with the outcome variable. The outcome variable was birthplace and was categorised as: (a) home;

(b) primary care facilities; and (c) hospitals/tertiary care facilities. The dependent variables included in regression analysis comprised all the variables which showed a significant association in chi-square test of association. The reference categories chosen for regression analysis were for convenience reason always the last category. It was ensured that, unlike the pre-intervention survey which may have contained some clinic data, in the post-intervention survey, the group hospitals/tertiary care facilities did not include any private clinics.

4.2.8.2 Focus group discussions

A focus group is a group of people, usually between six and twelve, who meet in an informal setting to talk about a particular topic that has been set by the researcher (Wong 2008). A facilitator keeps the group on topic but is otherwise non- directive, allowing the group to explore the subject and interact amongst each other (Longhurst 2003; Wong 2008). The purpose of conducting a focus group discussion is to obtain people's knowledge, perspectives and attitudes about issues and seek explanations for behaviours in a way that would be less easily accessible in responses to direct questions as in one-to-one interviews (Kitzinger 1995). Focus group discussion is suitable for health research because most health conditions are created or affected by social environments (Carter and Henderson 2005). Many authors have recommended slightly different number of minimum and maximum numbers of participants, for example six to eight (Tang and Davis 1995) or eight to ten (Fitzpatrick and Boulton 1994). But rather than focusing on an ideal number of participants, the main consideration should be a minimum number of participants to generate group discussion. At the same time there should not be so many participants so as to prevent the quieter ones from participating and contributing to the discussion and as a result making facilitation difficult (van Teijlingen and Pitchforth 2006).

4.2.8.2.1 Conducting the discussion

A focus group discussion was conducted in a place suitable and convenient for the participants; in this case it was the home of a local FCHV. The sessions took place in comfortable setting and sitting round in a circle to establish a facilitative atmosphere (van Teijlingen and Pitchforth 2006). There were altogether eight participants for the focus group discussion. The researcher acted as a facilitator who maintained an active role in conducting the discussion. The facilitator began by repeating the aim of focus group, taking informed consent and starting the discussion. The facilitator then took a back seat and later on adopted a more interventionist style to encourage the group to discuss inconsistencies and encourage the debate to continue. The researcher used the group process to encourage open, interactive discussion, while facilitating the conversation to foster inclusion, prevent domination and ensure the discussion remained on topic (Ritchie and Lewis 2003). Disagreements were used to encourage participants to put forward their own points of view. The researcher's main aim was to collect as much relevant information as possible whilst allowing participants to freely discuss the topic. The researcher thus remained non-directive as far as possible while pacing the discussion to ensure that the research objectives were met within the allocated time. The researcher also noted the important aspects of discussion such as noting non-verbal language, controlling the balance between individual contributions and addressing dominant participants (Kitzinger 1995). An image of researcher conducting focus group discussion with the participants after taking consent from the participants is shown in Figure 11.

Figure 11: Researcher conducting focus group discussion with women in community

4.2.8.3 Interviews

Interviews are a commonly used method for data collection in qualitative research to help understand the social issues and can focus on behaviour or experience, opinion or belief, feelings and knowledge (Britten 1995). Semi-structured interviews were used in this study to explore the reasons why women gave birth at either of these health facilities and what shaped their decision about which health facilities to use or to give birth at home. They were conducted as loosely structured, consisting of open-ended questions (Britten 1995). The semi-structured interview adopted the following characteristics of semi-structured interviews in that:

- The interviewer and interviewees engaged in a formal interview.
- The interviewer developed and used an interview guide containing a list of questions and topics to be covered during the conversation. This was prepared ahead of time.

- The interviewer, while following the interview guide deviated slightly or strayed away from the guide when they felt that this was appropriate to clarify or gain further information.

(Cohen and Crabtree 2006).

Interviews were conducted with the women who had utilised or planned to utilise the services at BCs and also with the health workers working mostly at the BCs. Different interview schedules were used for this purpose (Appendix E). The researcher approached potential interviewees and explained the purpose of the research. It was emphasised that a refusal would not affect their care, however participation in the research would be highly appreciated. The interviews were conducted at a time and place convenient for the interviewees and where no one could overhear the conversation. For example, many interviewees were interviewed in-front of their home making sure that their family members could not hear them during the process. The health workers were interviewed at the BCs. Written consent was obtained from each participant who could read and write; otherwise verbal consent was taken from those who were illiterate, and this was recorded in the participant information sheet before commencing the interview (Appendix F). The Nepalese language as well as the local language – Maithili or Awadhi, were used for interviews and focus groups. After the participants had agreed to take part in the research, the interview was tape-recorded, and contemporaneous field notes were taken by the researcher. As stated in Section 4.2.7, a pilot study was conducted before conducting the main study, which helped to test and refine the research questions, methods and tools for data collection. The tape-recorded interviews and discussions were transcribed and translated by the researcher, who speaks and understands English, Nepalese and the local

language fluently. More details about the number of interviews and other details are provided in Sections 6.1.1 and 6.1.2.

4.2.9 Validity and reliability of the study tools

Validity and reliability are two ways of showing and supporting the rigour of the research processes. Validity is about the closeness of what we believe we are measuring to what we intend to measure (Roberts et al. 2006; Heale and Twycross 2015). Researcher bias affects achievement of validity in qualitative research which arises due to selective collection and recording of data and interpreting from the researcher's personal perspectives. It is thus important to conduct interviews and focus groups properly, keeping in view of validity of research. The selection of participants for the qualitative part of study was done purposively. The participants were chosen because of qualities that they possessed, for example the community women were selected based on whether they used services from the BCs or will use them in future; and healthcare workers were chosen if they were working at the BCs and were available for interview (Etikan et al. 2016). However, the researcher was unfamiliar with the research setting or the potential participants and therefore, could not influence the sampling of participants.

The validity of questionnaire can be evaluated using several methods including face and construct validity (Bolarinwa 2015). The face validity of the questionnaire used in this Ph.D. study was established by (a) the student (b) the student's supervisors, who are expert in the field of maternal health, and (c) maternity care researchers in Nepal, looking at the questionnaire and evaluating whether each of the measuring items matched any given conceptual domain of the concept. The construct validity measures how meaningful the questionnaire is when it is used for a study. One of the most important concepts of construct

validity is convergent validity. The convergent validity was assessed by employing data enumerators who were trained and sent to field for collecting the data and compared with those which was collected by the researcher for quality control purpose (Bolarinwa 2015).

On the other hand, reliability means the ability of research tools or procedures such as questionnaires to produce similar results in different circumstances assuming nothing else has changed (Roberts et al. 2006; Heale and Twycross 2015). The reliability of the quantitative questionnaire was ensured by providing training to the data enumerators so that any confusion about the questions was solved and even if the survey was conducted by any of the trained enumerators, the same results would be obtained. Additionally, quality checks on the collected data was done by re-entering 10% of the survey data into SPSS by the researcher for verification and looking at the completeness of data entry. This verification process identified discrepancies in data entry (Cartwright and Seale 1990). Similarly, reliability in qualitative data is the trustworthiness of the procedures and the gathered data and is concerned with the accuracy with which similar results will be obtained on different occasions of conducting same data collection procedures such as interviews (Roberts et al. 2006). The reliability of the qualitative analysis was independently validated by two academic supervisors. This was achieved by translating two of the interviews by one supervisor, generating themes from two interviews and comparing these themes with those generated by the researcher by first supervisor. This rechecking is important to compare the observers' conduct and checking the dependability of data and procedures (Flick 1998).

The questionnaire used for this survey was adapted from various questionnaires, for example Nepal Demographic and Health Survey; and Water and Sanitation Survey. In addition, specific questions related to maternity services were added. Rigour to this research was

strengthened by using previously validated questionnaire (Sharma et al. 2016) for pre-intervention survey and pre-tested questionnaire used for post-intervention survey. Similarly, the interview schedules used for interviews and focus group discussions were continuously assessed and improved if required. For example, when participants did not understand certain questions, the wording of the question was changed slightly to make it more comprehensible.

4.3 Data management, analysis and interpretation

Due to the large sample size for the quantitative survey, data enumerators were employed to collect the completed questionnaires (Section 4.2.5.1), which was then collected in the local GTN office. The collected questionnaires were then transported to the GTN Kathmandu office. A local trainee, who was an undergraduate student in health, was selected to undertake data entry for SPSS (SPSS Inc., Chicago, IL, USA). The researcher supervised the trainee during data entry and entered some questionnaires for the purpose of cross-checking the reliability of the data entry. The qualitative interviews and focus group discussion was recorded, transcribed and translated by the researcher. Most of the structured questions for the quantitative study were close ended/ multiple choice. The quantitative survey data were coded and entered into SPSS. Similarly, in-depth interviews and focus group discussions were translated into English by the researcher and thematically analysed to generate themes.

The conceptual framework used for both quantitative and qualitative analysis was the WHO Quality of Care Framework for maternal and newborn health as shown in Figure 4 (Tuncalp et al. 2015). While data analysis was done separately, merging of data was done sequentially where quantitative results were explained by qualitative findings in the Discussion (Chapter 7).

4.3.1 Quantitative data analysis

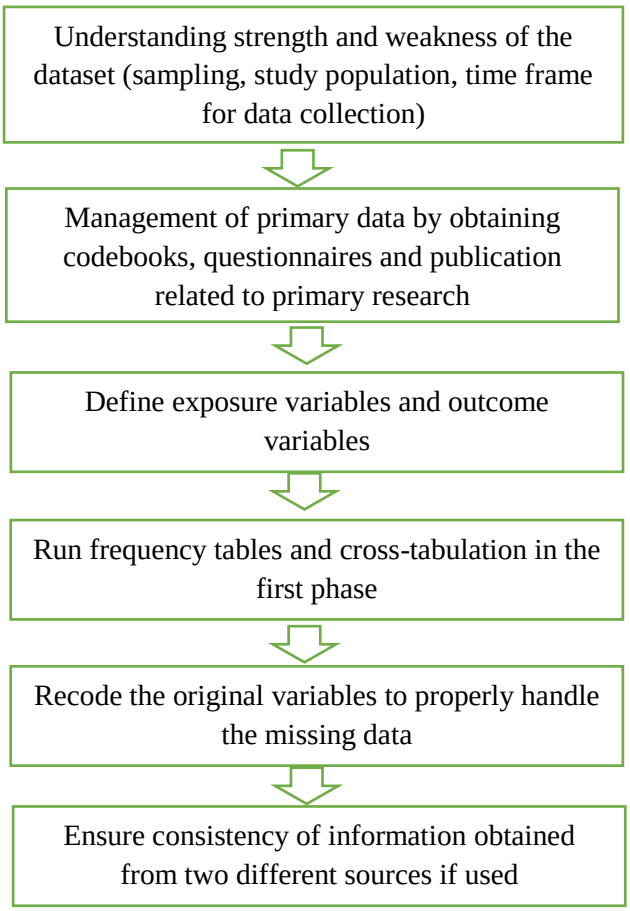
The quantitative part of the study was conducted in two phases. As this was a longitudinal (repeated cross-sectional) study, two datasets were analysed at two different phases. The baseline household survey was conducted in 2012, three years before the start of this study. The data collected during this time was entered into SPSS and was made available to the researcher. This dataset was also analysed using the results from all seven VDCs and was published as an academic paper (Mahato et al. 2017) (Appendix I.4). Part of this dataset was used for secondary analysis (pre-intervention analysis). Cheng and Phillips (2014, p. 371) described secondary analysis as "analysis of existing data in a cost-effective way to make full use of data that are already collected to address potentially important new research questions or to provide a more nuanced assessment of the primary results from original study". Secondary analysis included the data obtained from four VDCs to conduct the pre-intervention survey analysis. The same four VDCs were also surveyed in the post-intervention survey to account for the 'school effect', as discussed in Section 1.9. To avoid confusion over the use of terms, the secondary analysis will simply be referred to as the pre-intervention survey after this section. The data set along with questionnaires, information related to sampling frame, time frame of data collection and other information were obtained from the investigators involved in the primary research.

In the second phase of quantitative analysis, the pre- and post-intervention surveys were compared to identify any changes that might have occurred due to the intervention and also determine the factors affecting place of birth. In this phase of analysis, again, the data obtained from only four VDCs in both the pre- and post-intervention surveys were used for the purpose of comparison.

4.3.1.1 Secondary analysis

Secondary analysis for this thesis was undertaken for the analysis of data from pre-intervention phase. Secondary data analysis is the analysis of data that was collected by someone else for another primary purpose (Smith et al. 2011; Johnston 2017).

Figure 12: Steps of secondary analysis (adapted from Cheng & Phillips 2014 and Johnston 2017)



All the steps in this process (Figure 12) were followed wherever it was feasible. For example, it was not possible to obtain codebooks used for the primary data and there were no publications; only a preliminary report was obtained. Similarly, the last process was not applicable for the secondary analysis used in this study as only one source of information was available.

There are several strengths and weaknesses of secondary data analysis. The advantages are: they are cost-effective and convenient, since the secondary researcher does not have to invest time and resources in collecting the data. One of the advantages of conducting secondary analysis for this study was that a large high-quality dataset was obtained which would not have been possible to obtain by the researcher alone. So, obtaining a dataset for the pre-intervention analysis and analysing it as secondary data was helpful in saving time and resources. Although there are many advantages of secondary data analysis, there are some limitations as well. The main limitation is that the data are collected for some other purpose and may not contain specific answers that the researcher wants, or the data are not collected in the area of interest to the researcher. In this study as the codebooks were not available, it was sometimes difficult to understand some questions and also there were many questions which were irrelevant for this study. Another disadvantage is that the secondary researcher does not exactly know how the data collection was done as they are not involved during the data collection stage. They may not exactly know the non-response rate or misunderstand some questions (Johnston 2017). This was also true for this study, as the researcher was unable to know the exact procedures followed while conducting the primary research.

The secondary analysis aimed to determine the factors that affected utilisation of perinatal facilities available at primary care facilities (including BCs) and hospitals/clinics. Although studies conducted earlier in Nepal determined factors affecting birth at health facilities (Sharma et al. 2014; Shah et al. 2015), this study further explored the factors associated with different birth places including home, primary care facilities and tertiary care facilities. The analyses are listed in Sections 4.3.1.1.1 - 4.3.1.1.3.

4.3.1.1.1 Descriptive findings

The descriptive statistics are presented for the pre-intervention analysis, including general frequency tables of socio-demographic and socio-economic characteristics, health services, obstetrics and maternal characteristics as shown in Section 5.2.1.

4.3.1.1.2 Cross-tabulation

The chi-square test of association (cross-tabulation) was conducted for all the variables in the descriptive statistics (explanatory variables) with birthplace as the outcome variable. The variables which were found to be associated with place of birth were: age of respondent, caste of respondent, women's education, husband's education, husband's occupation, time to reach health facility, literacy of respondent, radio at home, television at home, having a motorcycle/scooter, timing of first antenatal check, decision maker for place of delivery and frequency of ANC visits. Only these significantly associated variables were entered into the logistic regression model.

4.3.1.1.3 Multinomial logistic regression

Multinomial logistic regression analysis was carried out with home/on way, primary care facilities and hospitals/clinics as outcome variables and all other dependent variables which were found as significant during chi-square tests. The significance level was set to 0.05 and only those variables which were significant were entered into the model, as shown in Table 9 in Section 5.2.1. Multinomial logistic regression compared birth at primary care facilities and hospitals/clinics with birth at home/on way as the reference category after adjusting for age of respondents, time to reach health facility, caste, husband's education, husband's occupation, literacy of respondents, radio at home, television at home, having a motorcycle or scooter at home, decision maker of pregnancy, timing of first antenatal check-up and

frequency of ANC visit. These factors were adjusted for, since they showed a significant correlation with birthplace using the chi-square test. However, three factors which showed a significant association (women's education, person assisting birth and financial assistance received) were removed from the model after checking for collinearity. For each covariate, the reference categories chosen for regression analysis were for convenience reason always the last category. Additionally, there were no natural reference categories and changing reference categories might not make lot of difference to the results but will only change how results are interpreted. Birth at home or on the way was kept as a reference, since the main objective of secondary analysis was to measure utilisation of perinatal services at health facility.

4.3.1.2 Comparative pre- and post-intervention analysis

Some of the analyses performed here were:

4.3.1.2.1 Descriptive statistics

Descriptive statistics means the simple way of reporting and presenting basic information about variables of interest in the form of tables, graphs, frequency and percentages (Duquia et al. 2014). In this study, the researcher used tables presenting frequency and percentages to report the initial findings. The descriptive findings were presented in the following tables: socio-demographic characteristics, health services, obstetric and maternal characteristics, ANC, PNC and abortion related knowledge and practice among women; practice related to childbirth, practice related to newborn care and women's empowerment (Section 5.2.2 and Appendix G).

4.3.1.2.2 Chi-square test

The chi-square test was used to identify associations between the outcome variable (intervention) and dependent variables as described in previously. In this study, the contingency table is complex rather than a simple 2 X 2 table and so the chi-square test was performed to see if any relationship existed between outcome and dependent variables.

4.3.1.2.3 Cramer's V

Table 5: Cramer's V strength of association

Degrees of freedom	**Strength of association**		
	Weak	**Medium**	**Strong**
1	.10	.30	.50
2	.07	.21	.35
3	.06	.17	.29
4	.05	.15	.25
5	.05	.13	.22

In this study, Cramer's V (along with adjusted residual) was conducted separately for all those variables which were found to be significant with chi-square test where intervention was cross-tabulated with all of these significant variables. These variables included age of women, women's education, husband's occupation, iron tablets taken during pregnancy, tetanus toxoid (TT) vaccine taken during pregnancy, money received during childbirth, place of birth, decision maker for place of birth, person assisting birth, frequency of antenatal check-ups, knowledge if abortion is legal, satisfaction with delivery services and time baby was washed first. A reference for Cramer's V strength of association is shown in Table 5.

4.3.1.2.4 Multinomial logistic regression

Multinomial and univariate logistic regression was used to compare birth at primary care facilities especially the BCs and hospitals/ tertiary care facilities with birth at home as the

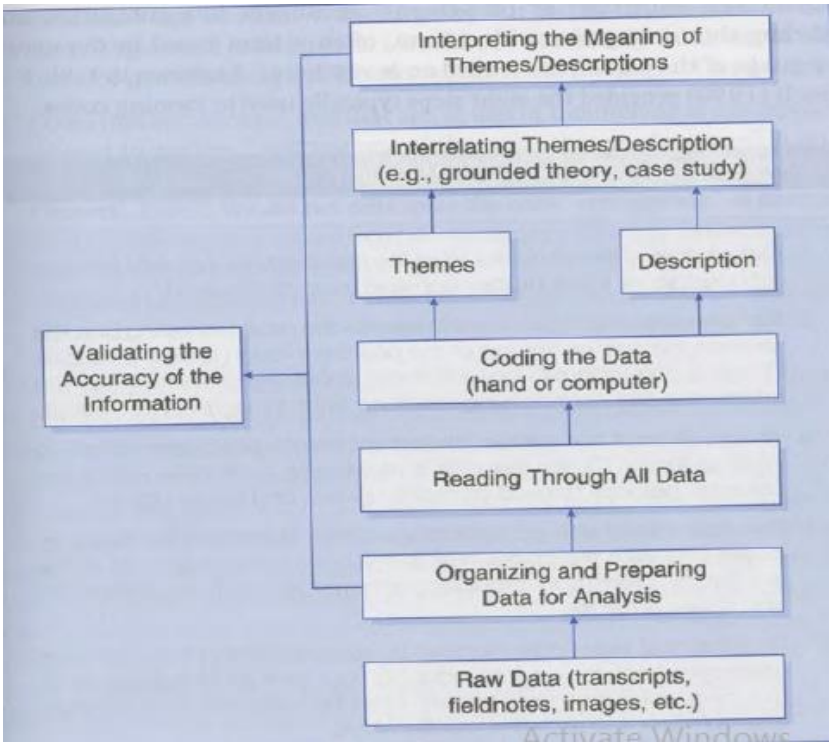
reference category after adjusting for intervention, decision maker for birthplace, frequency of ANC visits, age of respondents, respondent's education, husband's occupation, knowledge if abortion is legal, money received during childbirth, satisfaction with childbirth facilities and time baby was first washed. For univariate regression, these factors were compared with births at primary care facilities and hospitals/tertiary care as outcome variables. For adjusted multinomial regression, only the above-mentioned variables were adjusted for, since they showed a significant association with the pre- and post-intervention surveys. However, three factors which showed significant associations (iron tablets taken during pregnancy, TT vaccine taken during pregnancy and person assisting birth) were removed from the model after checking for collinearity. Here conducting adjusted regression allows adjustment of all other factors so that the effects of certain variable are measured. This also ensures that the results obtained is not just a temporal trend but is actually the effect of intervention. For each covariate, the reference categories chosen for regression analysis were for convenience reason always the last category. Additionally, there were no natural reference categories and changing reference categories might not make lot of difference to the results but will only change how results are interpreted. Giving birth at home was kept as the reference since this research focuses on measuring institutional birth. In this study the risk of type 1 error is low. Although there are a large number of tests, the testing used is explicitly described and uses sound statistical analyses (Field 2013).

4.3.2 Qualitative data analysis

4.3.2.1 Components of data analysis

There are seven stages of data analysis as presented with a linear, hierarchical approach building from bottom to top (Figure 13). Its also an interactive process where you validate the accuracy of the information by revisiting the process (Creswell 2014).

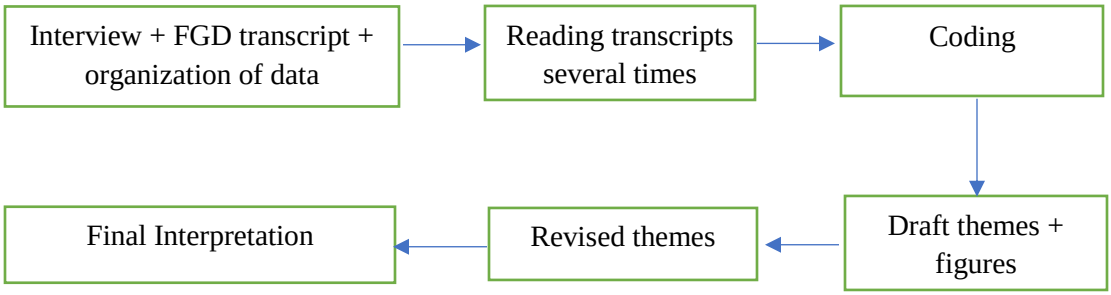
Figure 13: Data analysis in qualitative research (adapted from Creswell 2014)



In this study, transcripts of interviews and focus groups were available for analysis. However, the data collection went side by side with analysis in order to refine questions and add new dimensions to inquiry. Qualitative research uses analytical categories to describe and explain social phenomena which can be either derived inductively (obtained gradually for the data), or deductively (either at the beginning or part way through analysis) (Pope et al. 2000). This research used inductive approach to thematic data analysis. After obtaining the interviews and focus group transcripts, these were organised and were read a number of times to get familiarised. This provided a general sense of information content and an opportunity to reflect on its overall meaning and understanding general ideas (Creswell 2014). Then coding was assisted for all the interviews and focus groups using NVivo (version 11). Coding is a process of organising the data by bracketing chunks and writing a word representing a category in the margins (Creswell 2014). The nodes generated from the

coding were reorganised according to their similarities to form different themes. These initial themes were displayed in the form of figures which were again verified and revised several times to form the final themes. Finally, interpretation was done based on these final themes. Figure 14 explains the steps used in this research for qualitative analysis which is similar to the steps explained by Creswell 2014 (Figure 13) but modified as needed during the analysis.

Figure 14: Steps used for qualitative data analysis



4.3.3 Bringing data together/Integration of data

There are several advantages of integrating qualitative and quantitative data which can enhance the value of mixed methods research (Fetters et al. 2013). Several approaches to data integration has been described which can be implemented during several phases of research: study design; methods; and interpretation and reporting levels of research (Figure 15).

Figure 15: Levels of integration in mixed-methods research

Integration Level	*Approaches*
Design	3 Basic designs
	Exploratory sequential
	Explanatory sequential
	Convergent
	4 Advanced frameworks
	Multistage
	Intervention
	Case study
	Participatory—Community-based participatory research, and transformative
Methods	Connecting
	Building
	Merging
	Embedding
Interpretation and Reporting	Narrative—Weaving, contiguous and staged
	Data transformation
	Joint display

(Adapted from Fetters et al. 2013)

As shown in Figure 15, integration can occur in three basic designs: exploratory sequential, explanatory sequential and convergent. This study used *convergent* design (also called concurrent design) where qualitative and quantitative data are collected and analysed during a similar timeframe. Here, the qualitative and quantitative data collection occurs in parallel and analysis for integration begins well after the data collection process has started or after it has finished. In this design, the two forms of data are usually analysed separately and then merged. In this study, data integration occurred through connecting where results from one data collection procedure informed the next data collection approach of another procedure, the latter building on the former.

Data integration took place at the interpretation and reporting stage i.e. the narrative stage through a weaving approach where the findings of both qualitative and quantitative were

written together on a theme-by-theme or concept-by-concept basis (Fetters et al. 2013). The quantitative results depicted the utilisation of services from BCs and the qualitative results explained why the services were used or not used including the quality of services.

4.4 Ethical consideration for study

In order to undertake a health research project in a developing country, it is necessary to obtain ethics from university-based review board in addition to obtaining ethics approval from the research ethics board in the host country (van Teijlingen and Simkhada 2012). Ethical approval was applied from the University Research Ethics Committee (UREC) at Bournemouth University and approval was granted in November 2015 (Reference 8710). Ethical approval was also granted by the Nepal Health Research Council (NHRC) as the field work for this study took place in Nepal (see letter in Appendix H). A proposal was submitted in December 2015 to which NHRC provided some comments to clarify in January 2016. Clarification was provided, and full ethical approval was granted in February 2016.

Ethics is not limited to applying for and getting approval from a research institution; ethical norms served the aims of the research and applied to those who conducted the study (Resnik 2015). Due to the involvement of the researcher in the qualitative research, the interaction between researcher and participants presented some ethical challenges, such as maintaining anonymity, confidentiality, informed consent and the researcher's potential impact on the participants (Sanjari et al. 2014). During data collection, informed consent was obtained in either written or verbal form, from each participant (see Section 4.2.7.3). The consent process was clearly detailed in Nepali and was also explained verbally to all participants. The principle of voluntary participation was followed, and the participants were made aware that they could withdraw from the study whenever they wished (van Teijlingen and

Pitchforth 2006). Furthermore, confidentiality and privacy were maintained by explaining to the participants that their participation would remain confidential and information they provided would remain anonymous (Social Research Methods 2006).

It was also ensured that there was no disturbance during the interviews and focus group discussions to ensure privacy and confidentiality. These interviews and focus groups were recorded electronically after getting permission from the participants. Participants were allowed to ask any questions if they needed clarification. Sensitive topics such as stillbirth, the death of a child or power relationships such as male family members coming to listen to interviews were anticipated. In such situations, participants were reminded they could omit answering certain questions. The data collected during the research was stored in a password protected computer which was only accessed by the researcher and the transcripts were not identified by participants' names but by a numerical code.

4.5 Chapter summary

This chapter began with explaining the philosophical underpinnings of mixed methods study. Then it was explained further why and how mixed-methods were used for this study including how these two methodologies were combined. Next study design, study area, study population, sampling, sample size, data collection tools for quantitative and qualitative methods, validity and reliability of tools, data analysis used for the quantitative and qualitative phases, integration of data and finally ethical consideration for the study were discussed in detail.

CHAPTER 5 Quantitative results

5.1 Introduction

In this section, the results from the pre-intervention survey data and combined results of comparative pre-and post-intervention survey are presented. At the end, a summary of both of these separate analyses are provided as a chapter summary.

5.2 Findings

5.2.1 Results from pre-intervention survey data from Nawalparasi

Table 6 presents the socio-demographic and socio-economic characteristics of the study. The majority of women in the study belonged to the 20-24 year age group (38.8%), disadvantaged caste (90.5%), and Hindu religion (83.6%) and who were married between 15 and 19 years of age (53.8%). A higher proportion of women (66.3%) were illiterate compared to their husbands (33.5%). Almost all respondents were housewives (97.6%), whereas most of them (60.5%) reported that their husbands were farmers.

Whilst the majority of the households had electricity supply (82.6%), just over half (51.4%) had a television, and only 11.2% had a radio. The proportion of participants who reported they had a cement roof was 28%, 37.3% said it was tiled, whereas 26.1% stated it was made of cheaper materials such as hay and only 8.6% reported they had tin roofs. Only 17.4% respondents owned a motorcycle or scooter. Almost half of the respondents owned less than 10 K*atha* of land (45.2%).

Table 6: Socio-demographic and socio-economic characteristics of participants (pre-intervention)

Characteristics	Frequency (n)	Percentage (%)
Age (yrs) (n=420)		
15-19	46	11.0
20-24	163	38.8
25-29	148	35.2
30 and above	63	15.0
Caste (n=420)		
Disadvantaged	380	90.5
Advantaged	40	9.5
Religion (n=420)		
Hindu	351	83.6
Muslim and others	69	16.4
Age at marriage (years) (n=420)		
Below 15	89	21.2
15-19	226	53.8
20 and above	105	25.0
Education (n=407)		
Illiterate	270	66.3
Primary	112	27.5
Secondary and above	25	6.1
Main occupation (n=420)		
Housewife	410	97.6
Others	10	2.4
Husband's education (n=412)		
Illiterate	138	33.5
Primary	214	51.9
Secondary and above	60	14.6
Husband's occupation (n=420)		
Farmer	254	60.5
Skilled labour and teacher	101	24.0
Unskilled labour and other	65	15.5
Electricity at home = yes (n=420)	347	82.6
Radio at home = yes (n= 419)	47	11.2
Television at home = yes (n= 420)	216	51.4
Roof material of the house (n=418)		
Cemented	117	28.0
Tinned	45	8.6
Tiled	208	37.3
Hay	152	26.1
Own m.cycle/scooter =yes (n=420)	73	17.4
Land owned in *Katha (n=420)**		
Less than 10	190	45.2
10 and above	230	54.8

*1 *Katha* is equivalent to 720 sq ft.

Table 7 presents the health services, obstetric and maternal characteristics of the pre-intervention study sample. For majority of women (58.8%), the place of childbirth was home, followed by hospitals/clinics (29.5%) and primary care facilities (9.3%). Only 2.4%

of women gave birth at BC. For 64.0% people, the nearest health centre was less than one-hour's journey away. When asked about the decision maker for the birthplace, the largest single proportion reported their husband (42.1%), followed by family members and others (40.7%) including mother in law, father in law, maternal parents, grandmother or health workers; only 17.1% women said that they decided by themselves. Most births were assisted by skilled professionals (53.7%), which included doctors, nurses, health assistants, community medicine assistants, maternal and child health workers and other health professionals. Only 25.4% respondents reported that they received some financial assistance to give birth at a health facility. More than half of the respondents reported their age at first pregnancy to be at the age of 20 and above (53.1%). Most respondents had had between one and three pregnancies (81.9%); most reported their month of first pregnancy check-up falling in the second and third trimesters (45.2%), rather than in the first trimester (41.9%). More than 90% of respondents reported their last pregnancy as planned (92.1%) and when asked about their frequency of ANC check-up, more than half (55.5%) had had four or more.

Table 7: Health services, obstetric and maternal characteristics of respondents (pre-intervention)

Characteristics	Frequency (n)	Percentage (%)
Place of birth (n=420)		
Home	247	58.8
Birthing centre	10	2.4
Primary care facilities	39	9.3
Hospital/clinics	124	29.5
Time to reach health centre (n=420)		
Less than one hour	269	64.0
One hour and above	106	25.2
Don't know/ didn't disclose	45	10.7
Decision maker for birthplace (n=420)		
Woman	72	17.1
Husband	177	42.1
Family members/others	171	40.7
Skilled birth attendant* (n=417)		
Skilled health professionals	224	53.7
Unskilled people and others	193	46.3
Received financial assistance = yes (n=413)	105	25.4
Age at first pregnancy (years) (n=414)		
Below 15	10	2.4
15-19	184	44.4
20 and above	220	53.1
Total number of pregnancies (gravida) (n=420)	343	81.9
1-3	76	18.1
4 and above		
Timing of first pregnancy check-up (n=420)		
First trimester	176	41.9
Second and third trimester	190	45.2
Didn't disclose	54	12.9
Planning of last pregnancy (n=417)		
Planned	384	92.1
Unplanned	33	7.9
Frequency of antenatal check-up (n=420)		
Less than 4	140	33.3
4 and above	233	55.5
Don't prefer to disclose	47	11.2

* Skilled health attendant includes delivery at health facilities as well as home delivery

The chi square test of association between three different sites for birth showed various characteristics were significantly associated with the birthplace (Table 8). Amongst those significantly associated with birthplace were: woman's literacy, husband's education,

husband's occupation, women's education, timing of first antenatal check-up, decision maker for birthplace, person assisting birth, financial support received, frequency of antenatal checkup, having a motorcycle or scooter at home, electricity at home, radio at home and television at home.

Majority of both literate (48.3%) and illiterate (64.4%) women gave birth at home/on way. Similarly, majority of women whose husbands were illiterate (70.3%) and educated to primary level (57.5%) gave birth at home/on way. On contrary, most of women whose husbands were educated to secondary level gave birth at hospitals/clinics (45.0%). In the same way, majority of women whose husbands were farmer (64.6%), in skilled profession or teachers (53.5%) and unskilled or other profession (44.6%) gave birth at home/on way. Among the literate women, most of them who were educated to primary level gave birth at home/on way (48.2%). Similarly, among those who were educated to secondary level, most of them gave birth at both home/on way (40.0%) and hospitals/clinics (40.0%).

When looking at the timing of their first antenatal check, almost half of women who gave birth at home/on way had their first antenatal check-up in either the second or third trimester (49.4%), whereas most of the women who gave birth at primary care facilities had their first antenatal check-up in the first trimester (55.1%). This was also the case for women who gave birth at hospitals/clinics, with most of them having their first check-up in the first trimester (51.6%). In the group of women who gave birth at home/on way, the decision about the birthplace was mostly made by family members/others (43.3%), whereas in the group of women who gave birth at primary care facilities (57.1%) and hospitals/clinics (57.3%), the decision was mostly made by husbands.

Of all the births taking place at home/on way, the majority were assisted by unskilled professionals (77.9%). By contrast, almost all births taking place at primary care facilities (95.9%) and tertiary care facilities (98.4%) were assisted by skilled professionals. The majority of women who gave birth at primary care facilities received financial support (89.9%), whereas only 46.7% of those who gave birth at hospitals/clinics received financial support and only 1.7% of those who gave birth at home/ on way received financial support. In all three categories where births took place, the majority of the women's families did not own a motorcycle/scooter, did not have a radio at home but had electricity at home. Similarly, the majority of women who gave birth at primary care facilities and hospitals/clinics owned a television, whereas most women who gave birth at home/on way did not.

Table 8: Women's characteristics by health facility for birth (pre-intervention)

Characteristics		Home/ On way	Primary care facility	Hospitals/ Clinics	Total	p
Literacy (n=416)	Literate	71 (48.3)	25 (17.7)	50 (34.0)	146	.001*
	Illiterate	174 (64.4)	22 (8.1)	74 (27.4)	270	
Husband's education (n=412)	Illiterate	97 (70.3)	10 (7.2)	31 (22.5)	138	<.001
	Primary	123 (57.5)	28 (13.1)	63 (29.4)	214	*
	Secondary & above	22 (36.7)	11 (18.3)	27 (45.0)	60	
Husband's occupation (n=420)	Farmer	164 (64.6)	25 (9.8)	65 (25.6)	254	0.030
	Skilled/teacher	54 (53.5)	15 (14.9)	32 (31.7)	101	*
	Unskilled/other	29 (44.6)	9 (30.6)	27 (41.5)	65	
Women's education (n=407)	Illiterate	174 (64.4)	22 (8.1)	74 (27.4)	270	0.004
	Primary	54 (48.2)	20 (17.9)	38 (33.9)	112	*
	Secondary & above	10 (40.0)	5 (20.0)	10 (40.0)	25	
Timing of 1st antenatal check (n=420)	1st trimester	85 (48.3)	27 (15.3)	64 (36.4)	176	.001*
	2nd & 3rd	122 (64.2)	21 (11.1)	47 (24.7)	190	
	Don't disclose	40 (74.1)	1 (1.9)	13 (24.1)	54	
Decision maker for birthplace (n=420)	Participant	62 (86.1)	3 (4.2)	7 (9.7)	72	<.001
	Husband	78 (44.1)	28 (15.8)	71 (40.1)	177	*
	Family members/other	107 (62.6)	18 (10.5)	46 (26.9)	171	
Person assisting birth (n=417)	Skilled professional	54 (24.2)	47 (21.1)	123 (54.9)	224	<.001 *
	Unskilled/other	189 (97.9)	2 (1.0)	2 (1.0)	193	
Financial support (n=413)	Yes	4 (3.8)	44 (41.9)	57 (54.3)	105	<.001
	No	238 (77.3)	5 (1.6)	65 (21.1)	308	*
M.cycle/scooter (n=420)	Yes	32 (43.8)	10 (13.7)	31 (42.5)	73	0.013
	No	215 (62.0)	39 (11.2)	93 (26.8)	347	*
Electricity at home (n=420)	Yes	194 (55.9)	46 (13.3)	107 (30.8)	347	0.015
	No	53 (72.6)	3 (4.1)	17 (23.3)	73	*
Radio at home (n=419)	Yes	16 (34.0)	11 (23.4)	20 (42.6)	47	0.001
	No	231 (62.1)	38 (10.2)	103 (27.7)	372	*
Television at home (n= 420)	Yes	110 (50.9)	36 (16.7)	70 (32.4)	216	<.001
	No	137 (67.2)	13 (6.4)	54 (26.5)	204	*

* Significant at α level of 0.05

Table 9 shows the multinomial regression analysis results for factors affecting birthplace, where birth at primary care facilities and hospitals/private clinics was compared with those who gave birth at home/ on the way to the health facility. The estimates presented here for each variable are adjusted, controlling for all other variables in the model i.e. those variables found significant in the chi-square tests but excluding those variables with collinearity issues ('education', 'skilled birth attendant' and 'financial assistance received').

Generally, controlling for all other variables, the husband's educational level determined if the respondents gave birth at health facilities or not. Women whose husbands had only primary level education (OR 0.38, p-value 0.012) were significantly less likely compared to women with husbands with secondary level education to give birth at the hospitals/clinics. In contrast, women's literacy showed a significant association with birthplace if they were illiterate. Women who were literate compared to those who were illiterate were significantly more likely to give birth at primary care facilities (OR 2.49, p-value 0.018) compared to home/on way. The likelihood of women whose husbands were farmers giving birth at hospital/clinics compared to giving birth at home/on way was 0.45 times lower (p-value 0.030) than women whose husbands were unskilled.

Other significant socio-economic associations found were with the ownership of consumer durables. Respondents were more likely to give birth both at primary care facilities (OR 3.44, p-value 0.019) and at hospitals/clinics (OR 2.99, p-value 0.017) than giving birth at home/on the way if they owned a radio at home than those who did not. Similarly, those respondents who had a television at home also had a significantly higher likelihood of giving birth at primary care facilities (OR 2.26, p-value 0.034) than at home/on the way, compared to those who did not own a television.

Women whose husbands were the decision makers for the birthplace had an increased likelihood of giving birth at both primary care facilities (OR 3.09, p-value 0.005) and at hospitals/clinics (OR 2.30, p-value 0.005) than giving birth at home/on the way compared to women whose family members/others were the decision makers. However, the reverse was the case for respondents themselves, with women being less likely to give birth at both primary care facilities (OR 0.17, p-value 0.011) and hospitals/clinics (OR 0.19, p-value

<0.001) than at home/on the way if they were the decision maker for the birthplace place compared to family members/others. Finally, respondents who reported their frequency of the ANC visits as 'one to three' compared to 'four or more' were less likely to give birth at a primary care facility (OR 0.42, p-value 0.05) than at home/on way.

Table 9: Multinomial logistic regression of factors affecting place of birth (pre-intervention)

Variables	Primary care facility vs home/on way		Hospitals/clinics vs home/on way	
	OR (95% CI)	**P value**	**OR (95% CI)**	**p-value**
Husband's education (Ref Secondary and above)				
Illiterate	0.56 (0.16,1.83)	0.335	0.43 (0.18,1.03)	0.057
Primary	0.36 (0.21,1.47)	0.735	0.38** (0.18,0.81)	0.012
Husband's occupation (Ref Unskilled and others)				
Farmer	0.53 (0.20,1.40)	0.200	0.45* (0.22,0.93)	0.030
Skilled	0.83 (0.28,2.43)	0.738	0.78 (0.35,1.72)	0.532
Literacy (Ref Illiterate)				
Literate	2.49* (1.16,5.30)	0.018	1.52 (0.85,2.70)	0.156
Electricity at home (Ref No)				
Yes	2.20 (0.43, 11.18)	0.341	0.86 (0.39, 1.89)	0.706
Radio at home (Ref No)				
Yes	3.44* (1.23,9.64)	0.019	2.99* (1.22,7.39)	0.017
Television at home (Ref No)				
Yes	2.26* (0.95,5.64)	0.034	1.10 (0.59,2.05)	0.775
Have a motorcycle/scooter (Ref No)				
Yes	0.71 (0.28, 1.79)	0.470	1.32 (0.66,2.63)	0.430
Time 1st antenatal check (Ref Don't disclose)				
1st trimester	0.50 (0.04,6.04)	0.585	0.72 (0.11,4.77)	0.733
2nd and 3rd trimester	0.40 (0.03,4.63)	0.461	0.44 (0.07,2.89)	0.395
Decision maker for birthplace (Ref Fam members/others)	0.17**(0.05,0.68)	0.011	0.19***(0.08,0.47)	<0.001
Participant	3.09** (1.41,6.73)	0.005	2.30** (1.29,4.09)	0.005
Husband				
Frequency of ANC visit (Ref 4 or more)				
1-3	0.42* (0.18,1.00)	0.05	0.99 (0.57,1.70)	0.959

*p<0.05, **p<0.01, ***p<0.001 OR – Odds Ratio CI – Confidence Interval

5.2.2 Comparative results from pre- and post-intervention survey

For the post-intervention survey, 704 women were approached; however, one did not take part in the survey and four were removed after data cleaning, leaving a total of 699. This section reports the results obtained after comparing the effects of the pre- and post-intervention surveys on socio-demographic, health service and maternal characteristics. In addition, the results of regression analysis are reported afterwards.

Table 10 presents the socio-demographic characteristics of the pre- and post-intervention study samples. The single largest group of women belonged to: the 20-24 age group in both pre (38.8%) and post-intervention (46.8%) survey, (with slightly younger women represented in the post- intervention survey); belonging to a disadvantaged caste for both pre (90.5%) and post-intervention (92.8%); Hindu religion for both pre (83.6%) and post (84.0%) intervention and were 15-19 years of age at marriage for both pre (53.8%) and post (53.5%) intervention. For the pre-intervention sample, a higher proportion of women were illiterate (66.3%) compared to the post-intervention sample, where a higher proportion of women had primary level education (54.5%). A higher proportion of women reported their husband's occupation as a farmer in the pre-intervention sample (60.5%), whereas in the post-intervention sample a higher proportion of women reported their husband's occupation as an unskilled labourer or others (46.4%). Looking at this comparative data from pre- and post-intervention survey, it is evident that these two sets of data are comparable but not the same. Some variables have improved from pre- to post-intervention survey such as literacy of women, with more women being educated to primary level education in post-intervention (54.5%) than pre-intervention survey (27.4%). While other variables changed slightly such as age of marriage for women remained higher for age group 20-24 in both pre- and post-intervention survey although the percentage changed from 38.8% to 46.8%.

Table 10: Socio-demographic characteristics (Comparative)

Characteristics	Pre-intervention N (%)	Post-intervention N (%)
Age of women during study	420	699
15-19	46 (11.0)	28 (4.0)
20-24	163 (38.8)	327 (46.8)
25-29	148 (35.2)	226 (32.3)
30 and above	63 (15.0)	118 (16.9)
Caste	420	699
Disadvantaged	380 (90.5)	649 (92.8)
Advantaged	40 (9.5)	50 (7.2)
Religion	420	699
Hindu	351 (83.6)	587 (84.0)
Muslim and others	69 (16.4)	112 (16.0)
Education	407	699
Illiterate	270 (66.3)	205 (29.3)
Primary	112 (27.5)	381 (54.5)
Secondary and above	25 (6.1)	113 (16.2)
Husband's occupation	420	699
Farmer	254 (60.5)	234 (33.4)
Skilled labour and Teacher	101 (24.0)	141 (20.2)
Unskilled labour and Others	65 (15.5)	324 (46.4)
Age at marriage	420	699
Below 15	89 (21.2)	124 (17.7)
15-19	226 (53.8)	374 (53.5)
20 and above	105 (25.0)	201 (28.8)
Total people living in house	420	685
Less than 5	54 (12.9)	172 (25.1)
5-9	217 (51.7)	313 (45.7)
10-14	111 (26.4)	159 (23.2)
15-19	30 (7.1)	32 (4.7)
20 and above	8 (1.9)	9 (1.3)
Total number of children	415	699
Less than 3	364 (87.7)	623 (89.1)
3 and above	51 (12.3)	76 (10.9)

Table 11 presents the health service, obstetric and maternal characteristics of the respondents. Most of the women in the pre-intervention sample gave birth at home (58.8%), but this proportion decreased in the post-intervention sample (29.3%). Similarly, women who gave birth at BCs increased significantly from the pre-intervention sample (2.4%) to the post-intervention sample (28.3%). When asked about the decision maker for the birthplace,

the majority in the pre-intervention sample reported their husband (42.1%), whereas in the post-intervention survey, the majority reported the woman and family members (57.4%). There was an increase in the proportion of skilled health professionals who assisted the birth; in the pre-intervention sample it was 53.7% whereas in the post-intervention sample it increased to 70.5%. The frequency of ANC was highest for four and above in the pre-intervention sample (62.5%) which further increased to 80.3% in the post-intervention sample.

Table 11: Health services, obstetric and maternal characteristics of respondents (Comparative)

Characteristics	Pre-intervention (N, %)	Post-intervention (N, %)
Birthplace	420	699
Home	247 (58.8)	205 (29.3)
Birthing centre	10 (2.4)	198 (28.3)
Primary care facilities	39 (9.3)	88 (12.6)
Tertiary health centre	124 (29.5)	208 (29.8)
Decision maker for birthplace	420	699
Woman	72 (17.1)	102 (14.6)
Husband	177 (42.1)	86 (12.3)
Woman and family members	13 (3.1)	401 (57.4)
Family members/others	158 (37.6)	110 (15.7)
Skilled birth attendant	417	699
Skilled health professionals	224 (53.7)	493 (70.5)
Unskilled people and others	193 (46.3)	206 (29.5)
Received financial assistance for childbirth	413	693
Yes	105 (25.4)	370 (53.4)
Total number of pregnancies (gravida)	418	699
1-3	342 (81.8)	586 (83.8)
4 and above	76 (18.2)	113 (16.2)
Frequency of antenatal check-up	373	699
Less than 4	140 (37.5)	138 (19.7)
4 and above	233 (62.5)	561 (80.3)

A brief explanation of all tables in the Appendices is provided here. Appendix G.1 presents ANC, PNC and abortion related knowledge and practice. The proportion of women 'taking iron/folic acid' increased from 87.4% in the pre-intervention sample to 96.7% in the post-intervention sample. Similarly, 'two doses of TT vaccine taken' also increased from 94.1% in the pre-intervention survey to 98.0% in the post-intervention survey. There was only a minimum increment in PNC visits after childbirth from 38.9% pre-intervention to 42.2% post-intervention. There was only a slight increment in the proportion of women who knew about abortion being legal in Nepal from 10.5% pre-intervention to 19.7% post-intervention. However, the proportion of women who did not know about the legal status of abortion in Nepal decreased from 67.4% to 51.8%.

Appendix G.2 presents practice related to childbirth. The proportion of women 'receiving money for childbirth' increased markedly from 25.4% pre-intervention to 52.9% post-intervention. This was accompanied by a decrease in the proportion of women who reported they had to pay during childbirth, declining from 79.5% to 62.5%. Women who reported being 'highly satisfied' with childbirth services increased from 70.5% pre-intervention to 97.0% post-intervention.

Appendix G.3 reports practice related to newborn care before and after intervention. The proportion of women who reported 'bathing the baby immediately after birth' decreased from 32.7% to 17.9%; similarly, the proportion who reported 'bathing the baby after 24 hours' increased markedly from 30.2% to 70.8%. There was also an increase in the proportion of women who breastfed for the first time, which increased from 90.0% to 98.0%. The women who reported receiving a health check up within 24 hours of birth

increased markedly from 9.0% to 65.1% and those who reported no health checkup for their newborn baby decreased markedly from 69.4% to 0.7%.

Appendix G.4 presents the characteristics related to women's empowerment. A large proportion of women who reported their husband as the decision-making person about healthcare in the pre-intervention survey (47.2%) decreased drastically in the post-intervention sample (22.5%). While no one reported 'I and family members' as decision-making for healthcare in the pre-intervention sample, this increased to 46.5% in the post-intervention sample. Similarly, the in-laws as decision makers for healthcare decreased from 45.9% pre-intervention to 25.5% post-intervention. The majority of respondents reported family involvement in selecting a husband; for the pre-intervention survey it was 85.9% and for the post-intervention survey it was 85.4%.

Cross tabulation and strength of association

Table 12 reports the cross tabulation of the intervention with other characteristics. The chi-square association shows several factors were significantly associated with the intervention. Those characteristics which were significantly associated were: woman's age, woman's education, husband's education, iron tablets taken during pregnancy, TT vaccine received during pregnancy, money received for childbirth, birthplace, decision maker for birthplace, person assisting birth, frequency of ANC, knowledge if abortion is legal, satisfaction with childbirth services and time baby was first washed. All of these characteristics were significant at less than a 99% confidence interval.

Generally, the distribution of variables improved from the pre-intervention to the post-intervention sample except for the husband's occupation. The highest proportion of women belonged to the 20-24 age group in both pre-intervention (38.8%) and post-intervention

(46.8%) sample, with an increase of 8% seen in the post-intervention survey. Similarly, the highest proportion of women was illiterate in the pre-intervention survey (66.3%), whereas the majority of women were educated to primary level in the post-intervention survey (54.4%). Interestingly, the majority of husbands were farmers by profession in the pre-intervention survey (60.5%), whereas most of the husbands were unskilled labourers and others (46.4%) in the post-intervention survey. The proportion of women taking iron tablets during pregnancy increased from 87.1% to 96.7%; and the proportion of women receiving the TT vaccine during pregnancy increased from 94.1% to 98.0%. While 74.4% of women reported that they did not receive money for childbirth in the pre-intervention survey, a smaller majority of 52.9% reported that they received money for childbirth in the post-intervention survey.

For the majority of women, the birthplace was at home in the pre-intervention survey (58.8%), whereas this proportion decreased substantially to 29.3% in the post-intervention survey. For most of the women in the pre-intervention survey, the decision maker for the birthplace was their husband (42.1%), which changed to women and family members (57.4%) in the post-intervention survey. For the majority of women in the pre-intervention survey, the proportion attended by a skilled birth attendant was 53.7%, which increased to 70.7% in the post-intervention survey. Similarly, the frequency of ANC visits of '4 or more' increased from 62.5% in the pre-intervention survey to 80.3% in the post-intervention survey. While the majority of women in the pre-intervention survey (67.1%) did not know if abortion was legal, this decreased to 51.8% in the post-intervention survey. In the same way, the percentage of women who were highly satisfied with childbirth services increased from 70.5% in the pre-intervention survey to 97.0% in the post-intervention survey. Finally, the

percentage of babies who were washed within the first 24 hours after birth decreased from 69.7% in the pre-intervention survey to 29.2% in the post-intervention survey.

Table 12: Cross tabulation of intervention and other characteristics (Comparative)

Characteristics	Intervention		Total	P-value
	Pre N (%)	Post N (%)		
Age	N=420	N=699		<.001*
15-19	46 (11.0)	28 (4.0)	74	
20-24	163 (38.8)	327 (46.8)	490	
25-29	148 (35.2)	226 (32.3)	215	
30 and above	63 (15.0)	118 (16.9)	89	
Education	N=407	N=699		<.001*
Illiterate	270 (66.3)	205 (29.3)	475	
Primary	112 (27.5)	380 (54.4)	492	
Secondary and above	25 (6.1)	114 (16.3)	139	
Husband's occupation	N=420	N=699		<.001*
Farmer	254 (60.5)	234 (33.5)	488	
Skilled labour and teacher	101 (24.0)	141 (20.2)	242	
Unskilled labour & others	65 (15.5)	324 (46.4)	389	
Iron tablets taken during pregnancy	N=420	N=699		<.001*
	366 (87.1)	676 (96.7)	1042	
Yes	48 (11.4)	23 (3.3)	71	
No	6 (1.4)	0 (0.0)	6	
Don't know				
TT vaccine received during pregnancy	N=375	N=699		<.001*
	353 (94.1)	685 (98.0)	1038	
Yes	17 (4.5)	14 (2.0)	31	
No	5 (1.3)	0 (0.0)	5	
Don't know				
Money received for birth	N=414	N=699		<.001*
Yes	105 (25.4)	370 (52.9)	475	
No	308 (74.4)	323 (46.2)	631	
Don't know	1 (0.2)	6 (0.9)	7	
Birthplace	N=420	N=699		<.001*
Home	247 (58.8)	205 (29.3)	452	
Birthing centre	10 (2.4)	198 (28.3)	208	
Primary care facilities	39 (9.3)	88 (12.6)	127	
Hospitals	124 (29.5)	208 (29.8)	332	
Decision maker for birthplace	N=420	N=699		<.001*
	72 (17.1)	102 (14.6)	174	
Women	177 (42.1)	86 (12.3)	263	
Husband	13 (3.1)	401 (57.4)	414	
Women and family members				
Family members/others	158 (37.6)	110 (15.7)	268	
Skilled birth attendant	N=417	N=699		<.001*
Skilled professional				
Unskilled	224 (53.7)	494 (70.7)	718	
professionals	193 (46.3)	205 (29.3)	398	
Frequency of ANC	N=373	N=699		<.001*
Less than 4	140 (37.5)	138 (19.7)	278	
4 or more	233 (62.5)	561 (80.3)	794	
Know abortion is legal	N=420	N=699		<.001*
Yes	44 (10.5)	138 (19.7)	182	
No	94 (22.4)	199 (28.5)	293	
Don't know	282 (67.1)	362 (51.8)	644	
Satisfaction	N=420	N=699		<.001*
Highly satisfied	296 (70.5)	678 (97.0)	974	
Somewhat satisfied	108 (25.7)	13 (1.9)	121	
Highly dissatisfied	16 (3.8)	8 (1.1)	24	
Time baby was first washed	N=426	N=699		<.001*
Within 24 hours	290 (69.7)	204 (29.2)	494	
After 24 hours	126 (30.3)	495 (70.8)	621	

* - significant at less than 99% confidence interval.

To find out the strength of association between variables and where the association lies exactly, cross tabulation of the intervention with other significant variables was conducted. The outcome variable here was time (intervention categories, pre and post) and dependent variables were all those which were significant in chi-square test of association. Table 13 shows that the intervention was significantly associated with women's age during the study, as shown by p-value <.001. However, the strength of association as shown by Cramer's V value was medium and there was weak association seen within groups, as shown by adjusted residuals.

Table 13: Association of intervention and age of women (Comparative)

Age of women during study	Intervention		p-value	Cramer's V value
	Pre	Post		
15-19 (N, %)	46 (11.0)	28 (4.0)		
Adjusted Residual	4.5	-4.5	<.001*	.147
20-24 (N, %)	163 (38.8)	327 (46.8)		
Adjusted Residual	-2.6	2.6		
25-29 (N, %)	148 (35.2)	226 (32.3)		
Adjusted Residual	1.0	-1.0		
30 and above (N, %)	63 (15.0)	118 (16.9)		
Adjusted Residual	-0.8	0.8		
Total	420	699		

Table 14 shows that the intervention and women's education were found to be significantly associated, as shown by a p-value of less than 0.001. The association was relatively strong with the greatest association present in the illiterate group (12.0 -12.0). This means women's level of education had a significant difference in the uptake of and adherence to the intervention of establishing BCs and providing health education to women, with the highest difference seen amongst the illiterate.

Table 14: Association of intervention and women's education (Comparative)

Women's education	Intervention		p-value	Cramer's V value
	Pre	Post		
Illiterate (N, %)	270 (66.3)	205(29.3)		
Adjusted Residual	12.0	-12.0	<.001*	.362
Primary (N, %)	112 (27.5)	380 (54.4)		
Adjusted Residual	-8.7	8.7		
Secondary and above (N, %)	25 (6.1)	114 (16.3)		
Adjusted residuals	-4.9	4.9		
Total	407	699		

Table 15 shows that the intervention and the husband's occupation was found to be significantly associated (p-value <0.001); however, the Cramer's V value only shows a medium association and the greatest association is shown in the 'Unskilled labour and others group', as shown by the adjusted residual (-10.5, 10.5).

Table 15: Association of intervention and husband's occupation (Comparative)

Husband's occupation	Intervention		p-value	Cramer's V value
	Pre	Post		
Farmer (N, %)	254 (60.5)	234 (33.5)		
Adjusted Residual	8.8	-8.8	<.001*	.324
Skilled labour and teacher (N, %)	101 (24.0)	141 (20.2)		
Adjusted Residual	1.5	-1.5		
Unskilled labour and others (N, %)	65 (15.5)	324 (46.4)		
Adjusted residuals	-10.5	10.5		
Total	420	699		

Iron tablets taken during pregnancy' was recoded because the number of entries in the 'Don't know' group was very small. So 'Yes' was a separate group and 'No' and 'Don't know' were combined and recoded as 'No'. Table 16 shows that the intervention and iron tablets taken during pregnancy are significantly associated (p-value <0.001), however the Cramer's V value shows the strength of association is weak (0.189).

Table 16: Association of intervention and iron tablets taken during pregnancy (Comparative)

Iron tablets taken during pregnancy	Intervention		p-value	Cramer's V value
	Pre	Post		
Yes (N, %)	366 (87.1)	676 (96.7)	<.001*	.189
Adjusted Residual	-6.1	6.1		
No (N, %)	54 (11.4)	23 (3.3)		
Adjusted Residual	5.4	-5.4		
Total	420	699		

The 'TT vaccine received during pregnancy' was recoded because the number of entries in the 'Don't know' group was very small. So 'Yes' was a separate group and 'No' and 'Don't know' were combined and recoded as 'No'. Table 17 shows that there was high association between the intervention and the 'TT vaccine received during pregnancy' (p- value <0.05), however the Cramer's V value shows a weak association between these two.

Table 17: Association of intervention and TT vaccine taken during pregnancy (Comparative)

TT vaccine taken during pregnancy	Intervention		p-value	Cramer's V value
	Pre	Post		
Yes (N, %)	353 (94.1)	685 (98.0)	<.05**	.119
Adjusted Residual	-3.4	3.4		
No (N, %)	22 (4.5)	14 (2.0)		
Adjusted Residual	2.4	-2.4		
Total	375	699		

Money received after childbirth was recoded because the number of entries in 'Don't know' group was very small. So 'Yes' was a separate group and 'No' and 'Don't know' were combined and recoded as 'No'. Table 18 shows there is significantly higher association between the intervention and money received for childbirth (p-value <0.001), however the Cramer's V value shows the strength of association is medium (0.275).

Table 18: Association of intervention and money received during childbirth (Comparative)

Money received after childbirth	Intervention		p-value	Cramer's V value
	Pre	Post		
Yes (N, %)	105 (25.4)	370 (52.9)	<.001*	.275
Adjusted Residual	-9.0	9.0		
No (N, %)	309 (74.4)	329 (46.2)		
Adjusted Residual	9.2	-9.2		
Total	414	699		

The BC and PHCCs were recoded as primary care facilities. Table 19 shows there is a highly significant association (p<.001) between the intervention and 'choice of birthplace' and the strength of association is strong, as shown by the Cramer's V value (0.343). The adjusted residual shows that the strongest association between birthplace and intervention is in home (9.7, -9.7) and primary care facilities (-10.8, 10.8). This means intervention of establishing BC which comes under primary care facilities and providing health education to women had a significant difference in 'making choice for birthplace', with the highest difference shown in the BCs and home.

Table 19: Association of intervention and choice of place of birth (Comparative)

Place of birth	Intervention		p-value	Cramer's V value
	Pre	Post		
Home (N, %)	247 (58.8)	205 (29.3)	<.001*	.343
Adjusted Residual	9.7	-9.7		
Primary care facilities (N, %)	49 (11.7)	286 (40.9)		
Adjusted Residual	-10.3	10.3		
Hospitals/tertiary care (N, %)	124 (29.5)	208 (29.8)		
Adjusted Residual	-.1	.1		
Total	420	699		

Table 20 shows the decision maker for birthplace is significantly associated with the intervention (p<.001) and the strength of association is strong, as shown by the Cramer's V value (0.569). The adjusted residual shows the strongest association between 'decision

maker for birthplace' and the intervention is shown in 'husband' (11.4, -11.4) and 'woman and family' (-18.2, 18.2). This means the intervention of establishing BCs and providing health education to women had a significant difference in 'making decision for birthplace' with the highest difference shown in 'woman and family' and 'husband'.

Table 20: Association of intervention and decision maker for place of birth (Comparative)

Decision maker for place of birth	Intervention		p-value	Cramer's V value
	Pre	Post		
Woman (N, %)	72 (17.1)	102 (14.6)	<.001*	.569
Adjusted Residual	1.1	-1.1		
Husband (N, %)	177 (42.2)	86 (12.3)		
Adjusted Residual	11.4	-11.4		
Woman and family (N, %)	13 (3.1)	401 (57.4)		
Adjusted Residual	-18.2	18.2		
Family and others (N, %)	158 (37.6)	110 (15.7)		
Adjusted Residual	8.3	-8.3		
Total	420	699		

Table 21 shows there is a significantly higher association between 'assisted by a skilled birth attendant' and the intervention (p<.001); however, the strength of association is weak, as shown by the Cramer's V value (0.171). There is weak association within the different categories, as depicted by adjusted residuals.

Table 21: Association of intervention and person assisting birth (Comparative)

Person assisting birth	Intervention		p-value	Cramer's V value
	Pre	Post		
Skilled health professionals (N, %)	224 (53.7)	494 (70.7)	<.001*	.171
Adjusted Residual	-5.7	5.7		
Unskilled health professionals (N, %)	193 (46.3)	205 (29.3)		
Adjusted Residual	5.7	-5.7		
Total	417	699		

Table 22 shows there is a significantly higher association between 'frequency of antenatal check ups' and the intervention (p<.001). However, the strength of association is weak, as

shown by the Cramer's V value (0.193). The adjusted residuals did not show any strong association within the categories.

Table 22: Association of intervention and frequency of antenatal check ups (Comparative)

Frequency of antenatal check ups	Intervention		p-value	Cramer's V value
	Pre	Post		
Less than 4 (N, %)	140 (37.5)	138 (19.7)		
Adjusted Residual	6.3	-6.3	<.001*	.193
4 and above (N, %)	233 (62.5)	561 (80.3)		
Adjusted Residual	-6.3	6.3		
Total	373	699		

Table 23 shows there is a significantly higher association between 'knowledge if abortion is legal' and the intervention, as shown by the p-value < .001. However, the strength of association is weak, as shown by the Cramer's V value of 0.159.

Table 23: Association of intervention and knowledge of legal status of abortion (Comparative)

Knowledge if abortion is legal	Intervention		p-value	Cramer's V value
	Pre	Post		
Yes (N, %)	44 (10.5)	138 (19.7)		
Adjusted Residual	-4.1	4.1	<.001*	.159
No (N, %)	94 (22.4)	199 (28.5)		
Adjusted Residual	-2.2	2.2		
Don't know (N, %)	282 (67.1)	362 (51.8)		
Adjusted residuals	5.0	-5.0		
Total	420	699		

Table 24 shows that the intervention and satisfaction with childbirth services has a significantly higher association and the Cramer's V value shows a strong association (0.387). The adjusted residuals show the strongest association in 'highly satisfied' (-12.8, 12.8) and 'somewhat satisfied' (-12.4, 12.4). This means the intervention of establishing BCs and providing health education to women created a significant difference in satisfaction with childbirth services, with the highest difference shown in the 'highly satisfied' and 'somewhat satisfied' groups.

Table 24: Association of intervention and satisfaction with childbirth services (Comparative)

Satisfaction with delivery services	Intervention		p-value	Cramer's V value
	Pre	Post		
Highly satisfied (N, %)	296 (70.5)	678 (97.0)		
Adjusted Residual	-12.8	12.8	<.001*	.387
Somewhat satisfied (N, %)	108 (25.7)	13 (1.9)		
Adjusted Residual	-12.4	12.4		
Highly unsatisfied (N, %)	16 (3.8)	8 (1.1)		
Adjusted residuals	3.0	-3.0		
Total	420	699		

Table 25 shows that the intervention is significantly associated with 'time baby was first washed' ($p<0.001$). However, the Cramer's V value shows the strength of the association is weak. The adjusted residuals however, showed a strong association with 'baby washed within 24 hours' (13.2, -13.2) and 'baby washed after 24 hours' (-13.2, 13.2).

Table 25: Association of intervention and time baby was first washed

Time baby was first washed	Intervention		p-value	Cramer's V value
	Pre	Post		
Within 24 hours (N, %)	290 (69.7)	204 (29.2)		
Adjusted Residual	13.2	-13.2	<.001*	.395
After 24 hours (N, %)	126 (30.3)	495 (70.8)		
Adjusted Residual	-13.2	13.2		
Total	416	699		

Multinomial logistic regression

The results of unadjusted multinomial regression are presented before reporting the adjusted multinomial regression analysis. Table 26 presents unadjusted univariate analysis results for factors affecting birthplace. Both pre- and post-intervention survey data sets are combined and the effect of each variable on birthplace is measured.

Generally, the likelihood of giving birth at primary care facilities (mostly BCs) and hospitals/tertiary care facilities as compared to home increased post-intervention, with pre-intervention as the reference category. The increase was significant for both birth places, but the highest increase was seen for primary care facilities (OR 7.03, p-value <0.001) rather than for hospitals/tertiary care facilities (2.00, p-value <0.001). Women whose husbands were the decision maker for birthplace compared to family members/others had an increased likelihood of giving birth at both primary care facilities (OR 2.10, p-value <0.001) and hospitals/tertiary care facilities (OR 2.36, p-value <0.001) than giving birth at home. This was also the case when the decision maker for birthplace were women and family members combined, compared to family members/others, with significant results seen for both primary care facilities (OR 5.00, p-value <0.001) and hospitals/tertiary care facilities (OR 3.10, p-value <0.001) than giving birth at home. However, the reverse was the case for respondents themselves, with women being significantly less likely to give birth at both primary care facilities and hospitals/tertiary care facilities than at home if they alone were responsible for deciding about the birthplace compared to family members/others. Respondents who reported their frequency of ANC visits as 'one to three' compared to 'four and above' were significantly less likely to give birth at either primary care facilities (OR 0.30, p-value <0.001) or hospitals/tertiary care facilities (OR 0.55, p-value <0.001).

Generally, the likelihood of giving birth at hospitals/tertiary care facilities decreased with age and significant results were observed in the 15-19 and 20-24 age groups, with 30 and above as the reference category. In the 15-19 age group, the likelihood of giving birth at hospitals/tertiary care facilities was 2.17 times greater than giving birth at home (OR 2.17, p-value 0.019). Similarly, in the 20-24 age group, the likelihood of giving birth at primary care facilities was 1.55 times greater than giving birth at home (OR 1.55, p-value 0.035) and the

likelihood of giving birth at hospitals/tertiary care facilities was 2.15 times greater than giving birth at home (OR 2.15, p-value <0.001).

Women's education also affected the birthplace and was significant for both primary care facilities and hospitals/tertiary care facilities. Illiterate women were 0.32 times less likely to give birth at primary care facilities (OR 0.32, p-value <0.001) and women who had primary level education were almost half as likely (0.49) to give birth at primary care facilities (0.49, p- value 0.003), compared to giving birth at home, with 'secondary level education' as a reference category. Similarly, illiterate women were almost half as likely (0.46) to give birth at hospitals/tertiary care facilities (OR 0.46, p-value 0.002), compared to giving birth at home and with 'secondary level education' as a reference category. Those women who did not know that abortion is legal in Nepal were 1.87 times more likely to give birth at primary care facilities (OR 1.87, p-value 0.002) and women who knew that abortion is legal in Nepal were still 1.46 times more likely to deliver at primary care facilities (OR 1.46, p-value 0.026) compared to home, with 'don't know' as a reference category.

Interestingly, in the unadjusted regression analysis, a few other factors were seen to influence the birthplace, which were not seen in the adjusted analysis (Table 27). These were husband's occupation, satisfaction with childbirth services and time when baby was first washed. Women whose husbands were farmers and unskilled workers were significantly less likely to give birth at either primary care facilities or hospitals/tertiary care facilities compared to women whose husbands were skilled labourers and teachers. Women whose husbands were farmers were 0.46 times less likely to give birth at primary care facilities (OR 0.46, p-value <0.001) and women whose husbands were unskilled labourers were 0.56 times less likely to give birth at primary care facilities (OR 0.56, p-value 0.005). Significant results

were only seen for women whose husbands were farmers in choosing tertiary care facilities and were 0.58 times less likely to give birth there (OR 0.58, p-value 0.001). Women who were highly dissatisfied with the childbirth services were significantly more likely to give birth at primary care facilities (OR 3.43, p-value 0.029) and tertiary care facilities (OR 3.26, p-value 0.027), rather than giving birth at home, with 'highly satisfied' as the reference category. Women were significantly less likely to wash their baby within 24 hours of birth at both primary care facilities (OR 0.38, p-value <0.001) and tertiary care facilities (OR 0.59, p-value <0.001). compared to giving birth at home, with 'washing baby after 24 hours' as a reference category.

Table 26: Unadjusted Univariate logistic regression of factors affecting place of delivery

Variables	Primary health care vshome		Hospitals/tertiary vs home	
	OR (95% CI)	p value	OR (95% CI)	p value
Intervention (Ref Pre)				
Post	7.03***(4.93,10.03)	<0.001	2.00***(1.50,2.70)	<0.001
Decision maker for birthplace (Ref Family members / others)				
Women	0.29***(0.16,0.52)	<0.001	0.22***(0.12,0.40)	<0.001
Husband	2.10** (1.36,3.25)	0.001	2.36***(1.60,3.53)	<0.001
Women & family mem	5.00***(3.36,7.45)	<0.001	3.10***(2.10,4.60)	<0.001
Frequency of ANC visit (Ref 4 and above)				
Less than 4 (1-3)	0.30***(0.21,0.43)	<0.001	0.55***(0.40,0.77)	<0.001
Age (years) (Ref 30 and above)				
15-19	1.30 (0.66,2.53)	0.455	2.17*(1.13,4.16)	0.019
20-24	1.55*(1.03,2.33)	0.035	2.15***(1.40,3.29)	<0.001
25-29	1.19 (0.78,1.80)	0.421	1.22 (0.78,1.92)	0.367
Education (Ref Secondary & above)	0.32***(0.20,0.52)	<0.001	0.46**(0.28,0.76)	0.002
Illiterate	0.49**(0.30,0.78)	0.003	0.66 (0.41,1.08)	0.101
Primary				
Husband's occupation (Ref Skilled/ teacher)				
Farmer	0.46***(0.34,0.65)	<0.001	0.58**(0.42,0.81)	0.001
Unskilled labour & others	0.56**(0.38,0.84)	0.005	0.85 (0.58,1.26)	0.419
Know abortion is legal (Ref Don't know)				
No	1.87**(1.27,2.77)	0.002	1.06 (0.70, 1.61)	0.795
Yes	1.46*(1.05, 2.05)	0.026	1.21 (0.86, 1.69)	0.270
Money received for childbirth (Ref Don't know)	0.74 (0.07, 8.20)	0.803	0.33 (0.04, 2.99)	0.324
No	0.23 (0.02, 2.58)	0.235	0.13 (0.01, 1.12)	0.063
Yes				
Satisfaction with childbirth services (Ref highly satisfied)				
Highly dissatisfied	3.43*(1.13, 10.36)	0.029	3.26*(1.08, 9.83)	0.037
Somewhat satisfied	1.06 (0.32, 3.53)	0.930	1.67 (0.51, 5.40)	0.394
Time baby first washed (Ref after 24 hours)				
Within 24 hours	0.38***(0.28,0.51)	<0.001	0.59***(0.43,0.78)	<0.001

Table 27 presents the adjusted multinomial regression analysis results for factors affecting the birthplace, where birth at primary care facilities and hospitals/ tertiary healthcare facilities were compared with those births which took place at home. Both the pre- and post-intervention surveys were combined and the effect of each variable on birthplace was measured.

The estimates presented here for each variable were adjusted, controlling for all other variables in the model (variables found significant in the chi-square tests, but excluding those variables with collinearity issues ('iron tablets taken during pregnancy', 'TT vaccine received during pregnancy and 'skilled birth attendant').

Generally, controlling for all other variables, the likelihood of giving birth at primary care facilities (mostly BCs) and hospitals/tertiary care facilities as compared to home increased after post-intervention with 'pre-intervention' as the reference category. The likelihood was only significant for the primary care facilities (OR 5.19, p-value <0.001). Women whose husbands were the decision makers for the birthplace compared to family members/others had an increased likelihood of giving birth at both primary care facilities (OR 3.22, p-value <0.001) and hospitals/tertiary care facilities (OR 2.93, p-value <0.001) rather than giving birth at home. This was similar when the decision makers for the birthplace were 'women and family members', compared to 'family members/others', with significant results seen for both primary care facilities (OR 1.72, p-value 0.028) and hospitals/tertiary care facilities (OR 1.80, p-value 0.018). However, the reverse was the case for respondents themselves, with women being significantly less likely to give birth at either primary care facilities (OR 0.152, p-value <0.001) or hospitals/tertiary care facilities (OR 0.16, p-value <0.001) if they alone were responsible for deciding on the birthplace compared to family members/others.

Respondents who reported their frequency of ANC visits as ’one to three’ compared to ‘four and above’ had a significantly lower likelihood of giving birth at either primary care facilities (OR 0.39, p-value <0.001) or hospitals/tertiary care facilities (OR 0.64, p-value 0.021).

Generally, the likelihood of giving birth at both primary care facilities and hospitals/tertiary care facilities decreased with age, although significant results were observed only for the 15-19 and 20-24 age groups with ‘30 and above’ as the reference category. In the age group 15-19, the likelihood of giving birth at primary care facilities was 2.8 times higher than giving birth at home (OR 2.80, p-value 0.014) and the likelihood of giving birth at hospitals/tertiary care facilities was 3.2 times greater than giving birth at home (OR 3.22, p-value 0.003). Similarly, in the 20-24 age group, the likelihood of giving birth at primary care facilities was 1.7 times higher than giving birth at home (OR 1.70, p-value 0.041) and the likelihood of giving birth at hospitals/tertiary care facilities was 2.4 time higher than giving birth at home (OR 2.40, p-value< 0.001).

Women’s education also affected the birthplace but was only significant for those who had attended primary level education and given birth at primary care facilities. Women who had attended primary level education were half as likely to give birth at primary care facilities (OR 0.51, p-value 0.018) compared to giving birth at home, with ‘secondary level education and above’ as a reference category. Those women who did not know that abortion is legal in Nepal were 1.7 times more likely to give birth at primary care facilities (OR 1.74, p-value 0.028) compared to home, with ‘don’t know’ as a reference category.

Table 27: Adjusted Multinomial logistic regression of factors affecting place of delivery

Variables	Primary care facility vs home		Hospitals/tertiary vs home	
	OR (95% CI)	p value	OR (95% CI)	p value
Intervention (Ref Pre)				
Post	5.19***(2.30,9.00)	<0.001	1.43 (0.87,2.34)	0.155
Decision maker for birthplace (Ref Family members/others)				
Women	0.152***(0.08,0.29)	<0.001	0.16***(0.08,0.31)	<0.001
Husband	3.22*** (1.89,5.49)	<0.001	2.93***(1.82,4.73)	<0.001
Women & family members	1.72* (1.06,2.80)	0.028	1.80* (1.11,2.93)	0.018
Frequency of ANC visit (Ref 4 and above)				
Less than 4 (1-3)	0.39*** (0.26,0.60)	<0.001	0.64* (0.44,0.93)	0.021
Age (years) (Ref 30 and above)				
15-19	2.80* (1.23,6.35)	0.014	3.22**(1.50,6.90)	0.003
20-24	1.70* (1.02,2.72)	0.041	2.36**(1.45,3.90)	0.001
25-29	1.27 (0.76,2.11)	0.351	1.28 (0.77,2.15)	0.346
Education (Ref Secondary and above)				
Illiterate	0.83(0.48, 1.50)	0.536	0.69 (0.38,1.25)	0.217
Primary	0.51* (0.29,0.89)	0.018	0.60 (0.34,1.07)	0.082
Husband's occupation (Ref Skilled labourer & teacher)	0.86 (0.58,1.29)	0.461	0.77 (0.52,1.16)	0.201
Farmer	0.90 (0.56,1.44)	0.650	1.13 (0.72,1.79)	0.594
Unskilled labourer/others				
Knowledge if abortion is legal (Ref Don't know)				
No	1.74*(1.06,2.85)	0.028	1.15 (0.70, 1.90)	0.600
Yes	1.20 (0.79, 1.79)	0.403	1.07 (0.72, 1.60)	0.740
Money received for childbirth (Ref Don't know)				
No	0.87 (0.07, 10.40)	0.916	0.40 (0.04, 3.83)	0.428
Yes	0.43 (0.04, 5.06)	0.501	0.21 (0.02, 1.96)	0.740
Satisfaction with childbirth services (Ref highly satisfied)				
Highly dissatisfied	1.50 (0.40, 5.67)	0.549	2.21 (0.61, 8.01)	0.226
Somewhat satisfied	1.67 (0.39, 7.12)	0.494	1.96 (0.50, 7.75)	0.337
Time baby first washed (Ref after 24 hours)				
Within 24 hours	0.74(0.51, 1.07)	0.110	0.84 (0.60, 1.21)	0.356

5.2.3 Chapter summary

5.2.3.1 Summary of pre-intervention analysis

The results of pre-intervention analysis showed that the characteristics that had a significant association with birthplace included: woman's literacy, husband's education, husband's occupation, woman's education, timing of first antenatal check up, decision maker for birthplace, skilled birth attendant, financial support received, frequency of ANC, motorcycle/scooter at home, electricity at home, radio at home and television at home. Similarly, multinomial logistic regression was carried out, where births at primary care facilities and hospitals/clinics were compared to births at home/on way. The results showed husband's education, husband's occupation, literacy, radio at home, television at home, decision maker for birthplace and frequency of ANC visit affected the birthplace.

5.2.3.2 Summary of association of intervention with other characteristics

The cross tabulation of intervention and various characteristics showed that there was a strong association between the intervention and choice of birthplace, decision maker of birthplace, satisfaction with childbirth services and education. This means that the intervention of supporting BCs and providing health education to women of reproductive age by health promoters had a strong influence on determining and affecting choice of birthplace, decision maker for birthplace and satisfaction with childbirth services. Similarly, a woman's higher education level was likely to influence uptake of and adherence to the intervention. The association was strongest between the intervention and giving birth at home and primary care facilities (mostly BCs). In decision maker for birthplace, the association was strongest between the intervention and husband and woman and family member. In satisfaction with childbirth services, the association was strongest in the highly satisfied and somewhat satisfied groups, in women without education. A medium association

was seen between the intervention and ‘age’, ‘husband’s occupation’ and ‘money received for childbirth’, which means that there was only a medium effect exerted by the intervention on these characteristics.

5.2.3.3 Overall summary of comparative pre- and post-intervention survey

Cross-tabulation was conducted with the intervention as the outcome variable and dependent variables to investigate the effect of the intervention on these characteristics and how they were associated. Similarly, regression analysis for factors affecting the choice of birthplace was conducted in two ways: unadjusted univariate and adjusted multinomial.

(a) A strong association was seen between the intervention and choice of birthplace with the biggest difference from the intervention being observed in giving birth at home and primary care facilities (mostly BCs). This means that the intervention of establishing BCs and providing health education to women of reproductive age by health promoters has a strong influence on determining and affecting the birthplace, especially home and PHCCs. Similarly, the results of unadjusted univariate and multivariate logistic regression analysis both showed the likelihood of giving birth at primary care facilities and hospitals/tertiary care facilities increased post-intervention in comparison to giving birth at home, with the pre-intervention group as a reference category. However significant results in adjusted regression were only seen in primary care facilities, which means that after the intervention, more women opted to give birth at primary care facilities i.e. five times more (especially BCs), compared to giving birth at home. For unadjusted regression analysis, significant results were seen in both primary care facilities and hospitals/tertiary care facilities, with women being seven times more likely to give birth at primary care facilities compared to

giving birth at home and twice as likely to give birth at hospitals/tertiary care facilities, compared to giving birth at home.

(b) A strong association was also seen between the intervention and decision maker for birthplace; the biggest association was observed in husband, woman and family members. This means that the intervention of establishing BCs and providing health education to women of reproductive age by health promoters had a strong influence on determining the decision maker for the birthplace. In the same way, the likelihood of giving birth at primary care facilities and hospitals/tertiary care facilities as compared to giving birth at home was greater for women whose decision maker for birthplace were: husband's, and women and family members with family members and others as a reference category. But the likelihood of giving birth at primary care facilities and hospitals/tertiary care facilities was reduced for women who decided about their birthplace themselves. This means husband's and women and family members had more control over deciding the birthplace, whereas women themselves had less power in making such a decision.

(c) A strong association was also seen between the intervention and satisfaction with childbirth services, with the biggest influence observed in the highly satisfied and somewhat satisfied groups. However, results from the adjusted regression analysis did not show a significantly different likelihood of giving birth at primary care facilities or hospitals/tertiary care facilities. With unadjusted analysis, the likelihood of giving birth at primary care facilities and hospitals/tertiary care facilities compared to giving birth at home was three times higher for highly dissatisfied with highly satisfied as a reference category. This means that childbirth attended by health professionals in both primary care facilities and hospitals/tertiary care facilities caused more dissatisfaction amongst the women who used

the childbirth services in these facilities. At home, however, since there were no interventions, women were more likely to be satisfied.

(d) Another characteristic which showed a strong association was education, with the biggest influence observed in the illiterate group. Results from univariate regression analysis showed a decreased likelihood of giving birth at primary care facilities and hospitals/tertiary care facilities compared to giving birth at home if the women were illiterate or had attended primary level education, with secondary education and above as a reference category. These results showed women who were less educated or uneducated were less likely to give birth at primary or tertiary care facilities, compared to giving birth at home.

(e) A medium association was seen between the intervention and woman's age, as shown by the Cramer's V value; the difference within groups was also weak. The results of multivariate regression analysis however, showed the likelihood of giving birth at primary and tertiary health care facilities compared to home decreased with age, but significant results were only seen within some groups, with 30 and above as a reference category. Within the univariate analysis however, there was no trend of changed likelihood, but it was greater compared to the 30 and above group.

(f) A medium association was also seen between the intervention and husband's occupation; the biggest difference was seen in the group unskilled labourers and others, followed by farmers. However, the results of regression analysis only showed a significant difference in likelihood in the univariate regression analysis. The likelihood of giving birth at primary care facilities and hospitals/tertiary care facilities as compared to home decreased in the groups unskilled labourers and others and farmers, with skilled labourers and teachers as a reference category.

(g) A medium association was seen between the intervention and money received for childbirth with the biggest difference seen in both groups. However, the results of regression analysis did not show any significant difference in the likelihood of giving birth at primary or tertiary care facilities, compared to home.

(h) There were some other characteristics for which regression analysis showed different likelihoods, but the Cramer's V value showed no association. The characteristics which showed a significantly different likelihood of giving birth at primary and tertiary care facilities compared to home, were frequency of ANC visits and knowledge of abortion is legal with adjusted analysis. Time baby was first washed showed statistically significant results by unadjusted analysis only.

CHAPTER 6 Qualitative results

The qualitative analysis was carried out separately for women in the community and health care providers. In total, six interviews and one focus group discussion were conducted with women in the community and six interviews and one joint interview were conducted with health care providers from BCs and the DPHO. Six out of seven health care providers were ANMs working at the BCs in and around the catchment area of the intervention BCs. The remaining health care provider was a public health nurse working at the DPHO of the Nawalparasi district. The interviews intended to explore the level of satisfaction amongst women living in the surrounding community and the situation of birthing services available from the BCs in and around the intervention BC area.

6.1.1 Analysis – women in community

Six women in the community were interviewed and one focus group was conducted, which explored the participants' views on the maternal health services provided by the nearby BC. Table 28 summarizes the general characteristics of these six women and the responses they provided to factual questions which were not used for thematic analysis. The longest interviews was nine minutes in length and the shortest was four minutes.

Table 28: Details from women in community (interviews)

Participants	Name of BC visited	Distance to BC	Difficulty to reach BC	Place of ANC
WC1	Thulo Khairtawa	5 minutes	No, very near	Thulo Khairtawa HP
WC2	Thulo Khairtawa	1 minute	No, very near	Thulo Khairtawa HP
WC3	Narsahi	5 minutes	No, very near	Narsahi
WC4	Narsahi	20 minutes	No	Narsahi
WC5	Pratappur	10 minutes	No, went by motorbike	Pratappur HP
WC6	Thulo Khairtawa	10 minutes	No, went by motorbike	3 in Thulo Khairtawa and one in Simari PHC

WC = Women in the Community

For the focus group discussion, it was initially planned to conduct two separate focus groups for women in the community and health care workers. However, due to various circumstances such as difficulty in arranging a specific time for health workers to meet, it was difficult to conduct a focus group with health workers and in the end only one focus group discussion was conducted for community women in Narsahi VDC. A focus group discussion of a mixed group of women was conducted to capture differences of opinion between these two groups. One group of women who had attended a BC during childbirth and another group of women who had not attended the BC for childbirth were selected. The women in the community belonged to different wards of Narsahi VDC and there were eight participants in total. Of these eight participants, two gave birth at the local Narsahi BC, since it was established when they gave birth. The other six gave birth either at neighbouring BCs or other health facilities, including hospitals in surrounding areas, as Narsahi BC had not yet been established when they gave birth. The home of a local FCHV was selected as the place to conduct the focus group discussion. This FCHV also helped to gather the women for the focus group. The length of the

focus group was 22 minutes and it was moderated by the researcher with the help of an observer who took notes as well as clarified some questions in case of confusion.

Two main themes emerged out of the interviews and focus group discussions: (a) Birthing services and (b) Needs/Issues. These themes had different subthemes. Birthing services had the following subthemes: (i) Quality services; (ii) Health promotion activities; (iii) Incentive for birth; and (iv) Helpful/supportive ANMs. Needs/Issues had five subthemes: (i) Distance to BC; (ii) Awareness among women; (iii) Facilities at BCs; (iv) Referral service and (v) Preference for doctors or higher-level facility. Figure 16 shows the subthemes for 'Birthing services' and Figure 17 shows the subthemes for 'Needs/Issues'.

Figure 16: Subthemes: Birthing services

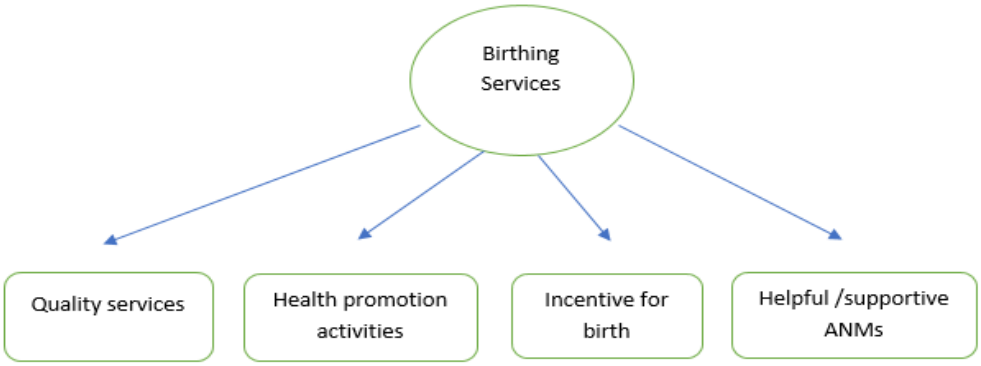
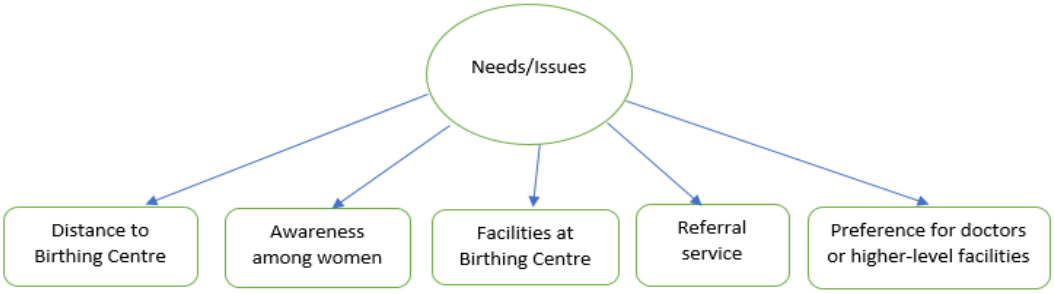


Figure 17: Subthemes: Needs/issues



6.1.1.1 Birthing services

(i) Quality services

All participants were very happy and satisfied with the services and the majority mentioned the good quality of services available at the BC and how it met their expectations. Most of them did not have anything to complain about with the services. When asked if they would recommend the BCs to others, almost all said that they would recommend the BCs they had attended to their friends and neighbours. Women found the BCs better than elsewhere:

> *"Yes, I received all necessary services as I expected. I found this birthing centre better than other places." (WC 3)*

Most were unable to comment on how things could be improved.

> *"As I didn't face any difficulty while I was there, there was nothing that I see that can be changed or improved at this birthing centre." (WC 5)*

(ii) Health promotion activities

Few participants mentioned that the health promotion activities, carried out either by GTN staff or the health staff including FCHVs in the villages, helped them to understand the

importance of giving birth at a health facility and motivated them to use services offered by the BC.

> *"At the birthing centre I was told the importance of delivering at the health facility. Also, I used to attend meetings conducted by Green Tara where they discussed about the importance of delivering at a birthing centre." (WC 6)*

(iii) Incentive for birth

All participants mentioned that they either already received the financial incentive for giving birth at a health facility or were in the process of receiving it. This incentive certainly acted as motivation to give birth at a BC.

> *"I received Rs 1,000 (£ 6.98) three days after delivery. They gave it to my husband after signing into a register. We bought nutritious food to eat with the money." (W2-FGD)*

(iv) Helpful/supportive ANMs

Most of the women in the community thought the ANMs showed professional behaviour and were helpful while performing their responsibility of assisting with normal birth. They also said that the ANMs communicated very well about the progress of labour and explained about the steps of labour. In addition, the participants thought that they received the kind of emotional support that is needed while giving birth. One woman even commented that she did not felt the need to take any family members inside the labour room, as the ANMs were themselves were very supportive.

> *"Yes, I was given enough information about progress of labour. The ANMs told me about each and every step during labour and encouraged me while I was labouring. I*

was very impressed by the behaviour of the ANMs; they were very supportive and helpful." (WC 1)

6.1.1.2 Needs/Issues

(i) Distance to birthing centre

Most of the women in the community shared that they preferred a BC located nearby in which to give birth. A few women also said that they had felt inconvenienced due to the lack of any health facility, especially not having a BC in their own village in the past. Women did not like health facilities located far away because of the difficulty in reaching them, as many remote villages lacked an ambulance facility.

"Since this birthing centre is very near it is very easy to reach here. If we had to go far, it would be inconvenient, and we would need an ambulance." (W6_FGD)

(ii) Awareness among women

Women in the community shared that there was a need to raise awareness amongst women to increase the number of births at the BC. They also said that people had the wrong idea about the quality of the BC and they were unable to understand the importance of having a BC located near them.

"If more people know about this BC through increasing awareness about the benefits of giving birth at BC, then the number of cases will increase." (WC 3)

(iii) Facilities at birthing centres

A few women expressed that there were still items or services that they needed to buy when giving birth at the BC, and it would have been better if they had not had to buy anything for

the birth. Some women also said that there was a need for more facilities at the BC, including blood tests and more ANMs, including a doctor.

> *"There is nothing as such except for the maternity pads, which I had to buy here. If it had been available here, I wouldn't have had to think about going elsewhere just to buy pads." (WC 2)*

(iv) Referral services

Non-availability of the ambulance service was seen as a demotivating factor and it was mentioned by several women in the community. The participants stated that, as the BC was the first point of contact, there should be a good referral mechanism which was seen to be lacking. The need for good referral services in case of emergency was thus identified by these women.

> *"If there was an emergency facility available at this birthing centre or nearby or even if the ambulance was available in our village, then it would be better in case there was an emergency." (WC 6)*

(v) Preference for doctors or higher-level facilities

There was also a preference to attend hospitals or a higher-level facility rather than the BC as people had more faith in doctors than ANMs working at the BC. Even if higher-level facilities were located far away from their place of residence, the lack of trust in non-doctor professionals such as ANMs often led them to choose such higher-level facilities. Although, one participant did mention that this perception might not be always right as she faced more difficulty when she attended PHC than attending BC located in her own village.

"But I have heard people talking in my community that we should not go to health posts/birthing centres for delivery but go to hospitals in the city since there are doctors. (WC 1)

"During delivery of my elder daughter, I went to Simari PHC but they referred me to Butwal hospital and I faced much difficulty then……., but this time it was much easier and near for me to go to BC in our village." (WC 2)

6.1.2 Analysis – healthcare workers

Seven healthcare workers were interviewed amongst whom there were six ANMs working at BCs; one was a public health nurse for the Nawalparasi district. Table 29 summarizes the general characteristics of the healthcare workers and the responses they provided to various questions that were not used for thematic analysis is shown below. A joint interview was conducted with ANM 6 and ANM 7, but for clarity their details are provided separately here. The longest interview (joint interview) was 23 minutes and the shortest was 12 minutes in length.

Table 29: Details of healthcare workers from interviews

Healthcare staff	Working BC or DHO	Years of service	Number of staff working at BC	Number of patients visiting BC	Nearest health institution
ANM1	Thulo Khairtawa	8 months	2 ANMs (1 GoN, 1 GTN)	8-25 per month	Narsahi and Simari PHC
ANM2	Narsahi	12 years	3 ANMs (1 GoN, 2 GTN)	10-12 per month	Pratappur and Triveni
ANM3	Narsahi	1 year	3 ANMs	10-12 per month	Pratappur and Triveni
ANM4	Narsahi	1 year	3 ANMs	10-12 per month	Pratappur and Triveni
ANM5	Thulo Khairtawa	2 years	2 ANMs	8-25 per month	Narsahi and Simari PHC
ANM6	Pratappur (Joint interview)	30 years	3 (GoN)	20-25 per month	Narsahi, Triveni and Simari PHC
ANM7	Pratappur (Joint interview)	8 years	3	20-25 per month	Narsahi, Triveni and Simari PHC
PHN1	Nawalparasi DHO	6 years	N/A	N/A	N/A

Two themes emerged out of these six interviews and one joint interview: (a) Running services; and (b) Support for services. These themes had different subthemes as shown. Running services had the following subthemes: (i) Quality of services; (ii) Referral services and issues; (iii) Opening hours; and (iv) Dissatisfaction with government; and (v)Need for counselling and awareness. Support for services had the following subthemes: (i) From government; and (ii) From GTN. Figure 18 shows the subthemes for ‘Running services’ and Figure 19 shows the subthemes for ‘Support for services’.

Figure 18: Subthemes: Running services

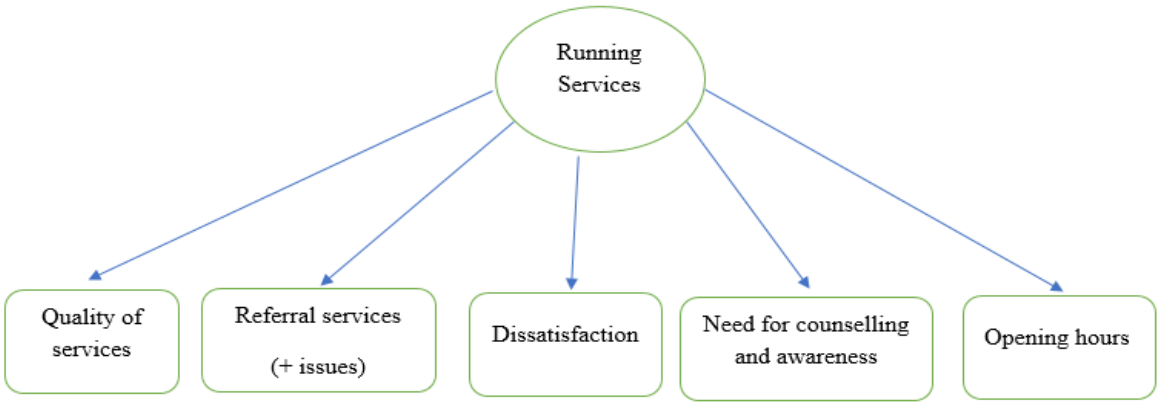
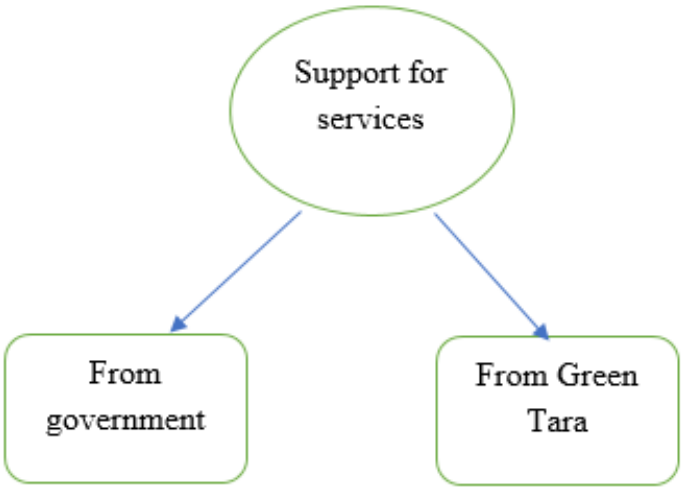


Figure 19: Subthemes: Support for services



6.1.2.1 Running services

(i) Quality of services:

Many participants mentioned the good quality services available from local BCs. In addition to the quality of the services, the participants also stated that women first chose these BCs

which are located in their own villages for normal births before considering going to higher level centres. From there, if there was a need, they were referred to higher level BEmONC or CEmONC centres located at some distance from their homes. They also commented that women from not only the village where the BC was located, but also from surrounding villages attended for birthing services. Furthermore, a few participants commented that almost all the women who came for ANC also came to give birth at the same BC. One participant said that sometimes there was a high patient load. All participants noted that the reason behind good quality services might be due to the availability of all the essential equipment provided by both GTN and GoN that is needed for normal birth.

> *"This is a remote area and there was no birthing centre before but after the opening of this birthing centre it has been very easy for people here since it provides quality service, it is easily accessible, and all medicines are also available." (HCW 3)*

Almost all the participants also expressed that communication about labour progress was done with the women at all times. They also said that they were given emotional support, counselling and care, which are essential during labour and childbirth.

> *"When women come here they are quite nervous, but we counsel them not to feel anxious, we tell them it's very difficult to give birth to a baby, but you need not worry, everything will be fine. From time to time we tell her about the progress of her labour and reassure her that it will not take a long time. Depending on the stage of her labour we tell her everything needed for her to know." (HCW 1)*

Lastly all healthcare providers stated that one of the family members is always allowed inside the labour room for emotional support and encouragement.

> "*Yes, we do allow the family members to enter the delivery room It is our policy to*

deliver the baby in the presence of one family member. Whoever accompanies the labouring woman, either her mother-in-law or sister-in-law, we allow one family member inside the delivery room." (HCW 1)

The following quote links to service provided by both GTN and the GoN (see Section 6.1.2.2).

"Yes, these birthing centres have all the essential equipment required for a normal birth which was provided by Green Tara and government." (HCW PHN)

(ii)Referral services and issues

The participants said that not everyone who came for delivery at the BC gave birth there; some were referred to higher level facilities if any complications arose. Referral was mostly to the CEmONC centre located in the district's capital (Parasi district hospital) or to tertiary hospitals or medical colleges outside the district in either Butwal or Bhairahwa city. One of the ANMs also mentioned that referrals were made based on the financial and health condition of mother and baby.

"If we need to refer, we send them to Bhairahwa medical college, depending on the family's financial condition. If a family doesn't have enough money, we refer them to Parasi, since there are facilities for CS and ICU as well and it is nearer. (HCW 5)

Although referral was made, some participants complained that there was a problem getting an ambulance in order to reach a higher-level health facility. They said that ambulance drivers were not ready to come to some rurally located BCs.

"The availability of ambulances is not so good here because of the bad condition of the

roads. The ambulance doesn't want to come at night but during the day, when it's not such a problem." (HCW 5)

Sometimes alternative transportation such as a rickshaw, jeep or motorbike was arranged for referral in the absence of an ambulance. The public health nurse working in the district health office commented that there should be good ambulance availability to refer complicated cases to BEmONC and CEmONC centres and that the government should think about this.

> *"There are three ambulances available in the surrounding areas: Parasi, Pratappur, and Chaupatta Samudayik hospital. As this place doesn't lie near the highway and during winter there's thick fog which makes it difficult to drive, so they don't want to come here." (HCW 5)*

(iii) Opening hours

All the healthcare providers said that the BC was open 24 hours and one ANM was always present in case an emergency case arose. Sometimes there was a situation where an ANM were called to the national or regional office to attend training; even in such an event, the BC was never left unattended. At least one ANM was always present even if others attended training. If all the ANMs were invited for training, they took turns to attend it.

> *"Yes, we do open 24 hours and the birthing centre is never closed. Whenever there is training or anything else, one of us always stays at the birthing centre." (HCW 3)*

(iv) Dissatisfaction with government

Some of the participants mentioned that the government does not provide all the equipment

and materials needed at the BC. If there is a shortage of any equipment, the ANMs said that they had to depend on GTN. Three participants also expressed their concern about the sustainability of the quality of services provided by BCs when GTN support ceased. GTN had supported the Thulokhairtawa and Narsahi BCs for two years and the participants were worried about staff management, instruments and other support when the support provided by GTN ended.

> "*I want to thank Green Tara for helping to establish a birthing centre, since we really needed one here. But we are really worried about the sustainability of this birthing centre since this project is only for two years. It would be better if the project continued for two more years. When the project finishes I am worried whether health staff will want to stay here or not, and if we will be able to manage for instruments and other support, so we really hope that Green Tara will support this birthing centre for a few more years." (Joint Interview HCW)*

(v) Need for counselling and awareness

A few participants mentioned that not all women who came for ANC also came to the same BC for childbirth services due to various reasons, but mainly due to distance. Some women even went to India or gave birth at home.

> "*Not everyone who comes for an ANC visit comes for delivery. Since I have started working here, I haven't seen any women from ward 1 of this village coming to this birthing centre for delivery." (HCW 1)*

Some participants stated that health promotion meetings organised by GTN staff were not able to convince all women to attend the BC for birth. Better motivating, awareness raising

and counseling of rural women was identified by participants as necessary to increase utilisation of the BC. The public health nurse said that if the incentive provided to the FCHVs was to be increased, it would have a positive effect on promoting women to attend BCs for birth.

> *"It is very difficult to motivate women to come here for delivery. Even women from wards 2 and 3 did not come here but now they have started to come. For the women who do not come here (especially from ward 1), we need to counsel more and tell them that all facilities are available here and that they do not need to go to India for delivery. We need to go to the community and hold meetings and promote them to come here for delivery." (HCW 1)*

6.1.2.2 Support for services

(i) From government

The participants mentioned that the government provided a budget, medicines and even instruments if needed. The budget was provided after conducting the deliveries. This budget from the government was used to provide incentives for deliveries to post-partum women according to government protocol. The government also built the BC building with support from GTN. In addition, the VDC helped the BC by appointing ANMs.

> *"The funding from the government is received into the account of our health post in-charge. When we need to distribute money for each delivery and ANC check ups to the cases, our health post in-charge and chairman of the VDC sign the cheque and then we receive money. If there is a need for any instruments or materials, then we inform the health post in-charge and he makes it available to us." (HCW 1)*

(ii) From Green Tara Nepal

GTN provided a monthly budget to meet the cost of operating the BC. Some instruments, medicine and maintenance were also provided by GTN in addition to those received from the government. GTN also conducted meetings and health promotion field visits to the villages to encourage women to attend the BC for childbirth.

> "*We also receive NRs 5,000 (£ 34.92) from Green Tara to purchase the necessary instruments and materials needed for the birthing centre. Materials like maternity pads, cord clamps and gloves are purchased with this money as the Nawalparasi District Public Health Office doesn't send us everything." (HCW 1)*

6.1.3 Chapter summary

This chapter discusses the qualitative findings of this study. The data resulted from conducting six interviews and one focus group with women in community and seven interviews with health care workers. The data were analysed thematically with the help of NVivo software. Two themes namely: 'birthing services' and 'needs/issues' were identified from interviews with the women in the community. Two further themes: 'running services' and 'support for services' were identified from interviews with healthcare workers. Facilitators and barriers to the utilisation of services in the BCs were identified. The participants were happy and satisfied with the quality of services at the BCs and the attitude and behaviour of the ANMs towards them. However, they expressed a need for increasing health promotion and awareness amongst women and the need for referral services in order to increase utilisation of the services available at BCs. The next chapter brings the various aspects of findings together overall.

CHAPTER 7 Discussion

In this chapter, the quantitative findings are compared and contrasted with the qualitative findings and the wider literature. The discussion is centered on the following main topics: (a) Utilisation of services at BCs; (b) Quality of services at BCs; (c) Distance to health facility and availability of referral service; and (d) Socio-economic factors. In the subsections under each topic, the quantitative findings are reported first and their meanings explained. Secondly the qualitative findings are used to explain and/or support the quantitative findings. Finally, these findings are linked to the literature. Wherever applicable, a comparison of the study areas with the WHO Quality of Care Framework (Tunçalp et al. 2015) for maternal and neonatal health (as shown in Figure 4) was made. Sometimes, in the absence of any material from the quantitative findings, only qualitative findings are reported, and their meaning is explained and then linked to the literature. The last section addresses the strength and limitations of the study.

7.1 Utilisation of services at birthing centres

Evaluating the utilisation of services and changes in perinatal services at BCs available before and after an intervention were the main quantitative objectives of this study. The pre and post-intervention surveys fulfilled the objectives of the thesis. Additionally, the community-based health promotion programme was found to be effective, however it was inadequate in attracting all women to use services at BCs and there was a need to intensify the health promotion messages among community women. Utilisation of ANC services available from the BCs and importance of having optimum ANC visits was also highlighted by the results.

7.1.1 Increased birth at birthing centres

This study reports the proportional increase in births at BCs located in the intervention area by almost 26% from pre- intervention (2.4%) to post-intervention (28.6%) and a decrease in home births by almost 30% from pre-intervention (58.8%) to post-intervention (29.3%) as highlighted in Section 5.2.2. The results of association between the intervention and birthplace showed a strong association between these two and the biggest association was seen in the 'primary care facilities' group (mostly BCs) followed by 'home' (Table 19). This demonstrates that BCs have an important role to play in increasing institutional births and consequently decreasing the home births.

Similarly, the results of unadjusted univariate and adjusted multivariate logistic regression analysis both showed that the likelihood of giving birth at primary care facilities and hospitals/tertiary care facilities increased post-intervention in comparison to giving birth at home with the pre-intervention group as reference category. However, significant results in adjusted regression were only seen in primary care facilities with a five times higher likelihood of giving birth at primary care facilities (Table 26 and 27). This means that after the intervention, more women opted to give birth at primary care facilities (especially BCs) compared to giving birth at home. The results of unadjusted univariate analysis showed a significantly higher likelihood of giving birth at both primary care facilities and hospitals/tertiary care facilities compared to giving birth at home. The likelihood of giving birth at primary care facilities was seven times higher, whereas the likelihood of giving birth at hospitals/tertiary care facilities was only twice as high. This also highlights that more women preferred giving birth at primary care facilities and also at hospitals/tertiary care facilities compared to giving birth at home (although the likelihood was much lower at hospitals than at primary care facilities).

The results from qualitative analysis provide an explanation for the increased births at the primary care facilities, mostly the BCs. Health staff, especially ANMs, commented that most of the women who came to the BC for ANC also attended for childbirth services (Section 6.1.2.1). The ANMs said that women came for childbirth services because of the availability of all the necessary equipment for normal birth. These ANMs also commented that women not only from catchment villages but also those from surrounding villages preferred these BCs for normal birth. Similarly, the women from community also said that these BCs were chosen initially for normal birth because of the availability of all the facilities and also because of its proximity to their place of residence. Some of these women also mentioned that they did not have to pay anything while utilising services available at BCs (Section 6.1.1.1).

This doctorate study reported that the proportion of births at BCs increased and reached 28.6%, which is greater than the proportion of births taking place at BCs in Nepal (27%) in 2016. Overall the proportion of births at BCs has been decreasing in Nepal, from 29% in 2015 to 27% in 2016. However, the results of this study showed the proportion of births at BCs has increased in the study area due to the intervention of supporting BCs and a health promotion programme. Several other studies also reported an increase in uptake of maternal health services, such as increased SBA delivery mostly at health centres, as a result of community-based interventions (Wilunda et al. 2016; Jacobs et al. 2018). This is particularly encouraging as the institutional birth rate in the Nawalparasi district is below 30%, although the national institutional birth rate is 54% (Ministry of Health 2016). The data for home births was not available from the latest health report 2015/2016 as the GoN has started supporting home births in the presence of SBAs using emergency obstetric care kits and obstetric first aid at home if complications occur. This provision has been made to support

safe births in settings where institutional birth services are not available (Ministry of Health 2016). The GoN recommends supporting BCs at strategic locations and also introducing BCs led by SBAs in all larger hospital maternity units which is shown by the increase in the number of BCs from 1,621 at the end of fiscal year 2071/72 (2015) to 1,755 at the end of fiscal year 2072/73 (2016) (Ministry of Health 2016). Nevertheless, the institutional birth rate at BCs is still decreasing (27% at the end of fiscal year 2016). In such a situation, supporting BCs along with running health promotion programmes to encourage women to attend BCs for delivery could be a solution to increasing the number of births at BCs.

One of the main strategies to improving the safety of intrapartum care, especially in LMICs is to give birth at a health care facility (WHO 2005). In many settings worldwide, primary care facilities provide EOC offered to women at low risk or uncomplicated pregnancies. Pregnancies that require or develop the need for higher level care are referred to facilities that can provide BEmONC or CEmONC (Long et al. 2016). In this regard, BCs are considered as homelike settings where women with uncomplicated pregnancies can give birth with the help of a midwife (Hermus et al. 2017). In general, BCs focus on a midwifery model of care which ensures continuity of caregiver, a family-centered approach and informed client participation in choices related to management of care (Laws et al. 2009; Hodnett et al. 2010). Women who receive midwife-led continuity models of care are less likely to experience intervention during childbirth and are more likely to be satisfied with their care (Sandall et al. 2016). The WHO recommendations on intrapartum care for a positive childbirth experience also lists midwife-led continuity-of care model for pregnant as of the component of including RMC, effective communication and companion during labour and childbirth (WHO 2018). In addition, midwives have a significant contribution in

providing quality care to women and infants with more efficient use of resources and improved outcomes (Renfrew et al. 2014).

WHO states that skilled care during pregnancy and childbirth is amongst the critical actions for increasing the survival of a child. This can be achieved by safe and clean delivery at birth and care of the newborn at birth (WHO 2005). Similarly, proven medical strategies to prevent or treat nearly 75% of complications of pregnancy can only be provided in a health facility set up. Thus, giving birth at health facilities can not only prevent/treat pregnancy related complications but also help in reducing maternal and neonatal mortality (Bhattacharya et al. 2016; Karmacharya et al. 2017). Although, planned home births take place in some developed countries and are also associated with fewer medical interventions (Wax et al. 2010; Olsen and Clausen 2012), the literature also suggests that it is associated with significantly elevated neonatal mortality rates and serious adverse neonatal outcomes (Grünebaum et al. 2017). In low-income countries, such as Nepal, it is thus best to reduce home births in the absence of a SBA and increase SBAs and institutional births. Encouraging BC birth is the best way to secure improved SBA attendance in rural communities. This is also a policy of the GoN which led to the launch of free institutional delivery care in the year 2009 (Ministry of Health and Population 2013). In addition, the government's policy of upgrading BCs and strengthening the competency of health staff may be helpful in increasing institutional delivery rates (Shah et al. 2018). This Ph.D. study also shows that an intervention of supporting BCs has effectively decreased the number of home births without SBA and increased the number of births at these BCs.

7.1.2 Health promotion intervention and needs

The quantitative findings for the health promotion activities were similar to the findings of supporting BCs (Section 5.2.2). The qualitative findings depicted that the women in the community admired the role of GTN health promoters as well as government level health promoters, including FCHVs, who were helpful in disseminating health promotion messages and encouraging women to attend the BCs for childbirth services. However, both women in the community and the health workers who were interviewed expressed the view that the health promotion messages were not enough to attract all the women to attend these facilities for labour and birth and not all of them who came for ANC visits attended these facilities for the birth services (Section 6.1.1.2 and Section 6.1.2.1). The health workers felt the need to intensify the health promotion meetings and messages through various means, either through mothers' group meetings or through FCHVs or even ANMs. Similarly, the community women were still unaware about the importance and need for attending birthing services available from the BCs. So, it seems imperative that there must be introduction of more community-based health promotion intervention packages either through government or even GTN working in this region. This can be achieved by either increasing the number of GTN health promoters who can reach more women and also modify their curriculum and messages in order to motivate these marginalised women living in a culturally sensitive community. Alternatively, the government needs to add or increase more health promoters working especially in rural communities who can deliver health promotion messages effectively and thus create awareness and motivate rural women.

The community-based health promotion intervention took into account the diverse/changing needs of local communities and the best use of existing resources (van Teijlingen et al. 2012). Reviews have shown that community-based intervention packages reduce morbidity

for women, mortality and morbidity for babies and improves care-related outcomes and the health of mothers, neonates and children, particularly in low and middle-income countries (Lassi et al. 2010; Perry et al. 2017). One study also highlighted the value of integrating maternal and newborn care in community settings through a range of interventions which could be effectively delivered through community health workers and health promoters (Lassi et al. 2010).

The findings also suggest the need for providing additional health promotion training to ANMs and FCHVs. Research on ANMs working in the same region has shown that ANMs who are provided additional training on issues such as perinatal mental health can then reach the community members and increase their knowledge and awareness regarding mental health issues (Mahato et al. 2018d) (Appendix I.6).

The findings suggested a preference for doctors or higher-level facilities over giving birth at BCs. This indicates a need for more health promotional messages to inform women and also their family members that labour will not be shorter or easier if women visit hospitals or give birth in the presence of doctors. As research also suggests, second labour is much quicker (Barton et al. 1991) and therefore often easier than first labour, this needs to be conveyed to women and their family members.

Since one of the major roles of FCHVs is to provide health promotion and they have a large burden in terms of their workload, one of the health workers suggested providing more incentives or reimbursements to motivate these FCHVs in their role as health promoters. ANMs also have an important role to play as potential health promoters who can motivate and educate local women about the significance of attending BCs for normal births.

Health promotion activities in Nepal mostly include health education and behavioural change communication rather than broader health promotion activities as described by the Ottawa Charter (Sharma et al. 2015). It is important that health promotional interventions are targeted to women, their husbands and family members especially mothers-in-law, which can be effectively done by FCHVs and ANMs in Nepal. The current situation also shows a lack of evaluation of health promotion in health programmes and government leadership. While planning for health promotion-related activities, it is important to learn from the success of other countries, recognising and building on success and also by involving the community and general public (van Teijlingen et al. 2012). Co-ordination between central government and local state level government in the new federal government system of Nepal seems imperative for conducting health promotion activities based on research findings (practice-led research), along with focusing on a social and empowerment approach rather than only stressing the medical, educational and behavioural approaches to health promotion.

A cluster randomized trial conducted in a rural area of Pakistan where a community-based intervention package was implemented through community health workers (lady health workers), gave similar results. This Pakistani study concluded a need to scale-up preventive and promotional maternal and newborn interventions through community health workers and increase the coverage of such interventions to maximise their potential (Bhutta et al. 2011). Review studies concluded community-based interventions could be an important component of a comprehensive approach to accelerating improvements in maternal health and reducing preventable maternal deaths by 2030 (Jennings et al. 2017). A similar review study in a series of studies related to the effectiveness of community-based interventions

found that such interventions can equally be employed in effective ways to improve neonatal health in high mortality, resource constrained settings (Sacks et al. 2017).

Similar to this thesis study, the evaluation of a community-based intervention to promote safe motherhood focusing on knowledge and behaviour change to reduce maternal mortality and birth complications, found participatory sessions led by community volunteers can increase safe motherhood knowledge and encourage the use of essential maternity services (Turan et al. 2016). The latter study reported significant increases in the proportion of women who had four or more ANC visits and a greater increase in birth in a health care facility in the intervention area (Turan et al. 2011). However, a study conducted in a rural hilly district of Nepal (Sharma et al. 2016) concluded community-based health promotion intervention has a much stronger effect on the uptake of antenatal care and less on women seeking delivery care.

The intervention of supporting BCs also included providing community-based health promotion intervention by health promoters in the catchment area of the BCs. The findings showed an increase in the proportion and likelihood of giving birth at BCs, which may be due to the combined effect of both activities as interventions. The effect of health promotion and supporting BCs was measured together, so the individual effects of health promotion on the uptake of BCs could not be differentiated. The findings of this study suggest, health promotion messages may have augmented the uptake of birthing services available from the BCs

7.1.3 Importance of having optimum ANC visits

The results of both the surveys showed a decreased likelihood of giving birth at primary care facilities and hospitals/tertiary care facilities if the women had less than four ANC visits

with reference to ‘four and above ANC visits’ (Sections 5.2.1-5.2.2). Although the results for the pre-intervention survey were significant for only primary care facilities, the results of the comparative pre- and post-intervention survey was significant for both primary care facilities and hospitals/tertiary care facilities. The results thus depict the importance of having four or more ANC visits, which seems to encourage women to attend health facilities for giving birth.

The qualitative findings also show that the women were more informed about attending the health facilities for ANC visits. So, a high percentage of women attended BCs for ANC services, but not all of them came to the same BCs for childbirth services due to several factors, with distance being the most significant

Studies in Nepal have highlighted the importance of education, socio-economic and socio-cultural status on determining the uptake of ANC services. This pointed to the presence of cultural barriers for women in the Terai belt for attending the ANC visits, although the presence of middle-class women was highest in the Terai (Maleku and Pillai 2016). One study conducted in southern Terai of Nepal (the women of which are of similar socio-cultural status as in this thesis study) reported intimate partner violence to be associated with low utilisation of antenatal care services (Singh et al. 2008). Additionally, decision making power related to ANC visits was less for women in Terai region compared to those living in mountains and hilly regions. The literature suggests that people living in the mountains and inner Terai (Nawalparasi lies in inner Terai) regions are an absolute minority and belong to most marginalised groups (Gurung 2003). One study which examined the results from four important national surveys of Nepal, highlighted that although the country has made immense progress in increasing its ANC visits from 49% in 2001 to 88% in 2014, the rate of

institutional births increased from 7% in 2001 to only 44% in 2014 (Målqvist et al. 2017). Furthermore, one study found that improving the quality of ANC visits will have a positive and motivating effect on women utilising institutional delivery services (Dixit et al. 2017).

Similar to the above-mentioned studies, the population of this study consisted mainly of women belonging to disadvantaged castes in the Terai, with low levels of education and decision-making power. These women are dependent on either their husbands or other family members for decisions related to household and health related matters.

7.2 Quality of services at birthing centres

According to Tunçalp (2015), quality of care during childbirth in health facilities is reflected by available infrastructure, supplies, management, and skilled human resources. This study assessed the quality of care by measuring the provision of care and experience of care through interviewing the healthcare staff (mostly ANMs working at the BCs) and women in the community who utilised the services. As evident in Figure 5, provision of care includes three criteria: (1) functional referral services; (2) evidence-based practice for routine care and management of complications; and (3) an actionable information system. This study assessed the functional referral system. However, the other two criteria were neither evaluated nor included in the questionnaire since BCs are the first contact point for maternity care in rural parts where only uncomplicated, normal births are dealt with. Management of complications is being referred to higher BEmONC and CEmONC facilities. Additionally, BCs are basic health facilities and lack complicated information systems, but monthly paper-based reports are sent to the PHCCs as the higher-level health facility.

7.2.1 Availability of 24 hours service

In this study, ANMs mentioned that the BCs are open 24 hours and even if someone attends training, they take turns to attend but never leave the BC unattended or close it to attend training (see Section 6.1.2.1). All healthcare providers commented that they had all essential equipment needed for normal birth along with the necessary infrastructure required for a BC. The support to make all equipment and infrastructure available for normal birth was credited not only to the government but also to the local NGO, GTN which provided the necessary help in the form of financial support or sometimes equipment maintenance. The necessary medicines were provided by the government and sometimes GTN as well (see Section 6.1.2.1). To support their statement, the ANMs also claimed that because of the availability of services, women, came to avail themselves of the services at the BCs not only from the same village but also from surrounding villages. The availability of a 24-hour EmONC service is considered as an essential component of quality of care; however, to ensure that the needs of women are being met, it is equally important to monitor women's perception of the midwifery and obstetric care provided at health facilities (Ministry of Health 2004).

7.2.2 Availability of necessary equipment

Among the factors affecting the quality of care, the availability of equipment at a health facility was also important, as shown by the results of systematic review (Mahato et al. 2018b) (Appendix I.3). The women in community, who experienced the quality of care provided by the BCs, commented about the availability of all facilities at the BCs and the fact that women in their villages chose these BCs for normal birth. Nevertheless, many stated that they did not have to pay anything when they came to the BC to give birth, but received the financial incentive provided by the government. Two women said that they had to pay for maternity pads, which they thought would be made available at the BC free of

charge. From what the women said during the interviews, it was clear that these women were not aware that they needed to pack supplies and materials to bring to the facility. In high-income countries like the United Kingdom, there is a trend of packing hospital maternity bags usually two weeks ahead of the due date (NHS Choices 2018). It may be impractical to expect poor women living in such rural locations to pack their maternity bags, although preparing necessary to supplies and materials bring to the facility is one of the elements of birth preparedness and complication readiness (BP/CR) (WHO 2015c).

One of the components of quality of care, according to the WHO Quality of Care Framework (Tunçalp et al. 2015) for maternal and neonatal health is the availability of essential physical resources, which was reported to be satisfactory by both the health care workers and the women in the community. The availability of physical resources was felt to be optimum by both groups of interviewees. However, some healthcare workers were dissatisfied with the government as they did not provide all the necessary equipment. In these occasions, where there was a lack of government supply of medicines or some equipment, the budget available from GTN was used to cover these deficiencies (Section 6.1.2.1).

Birth preparedness packages were introduced by the Government of Nepal in 2002 to communicate the BP/CR messages by using birth preparedness tools by community health workers (JHPIEGO 2004). The BP/CR components included knowing the danger signs of pregnancy, childbirth and the post-partum period, identifying a health facility and skilled birth attendant, attending a health facility for an ANC, arranging transport, saving money and identifying a potential blood donor (JHPIEGO 2004). Also included in the BP/CR components are: knowing the location of the closest facility for birth and in case of

complications, the necessary supplies and materials to bring to the facility, an identified labour and birth companion and an identified support to look after the home and other children while the women are away (WHO 2015c). It is thus implied that the information about the necessary materials to bring to the health facility needs to be communicated by the ANMs or FCHVs to pregnant women (and their families) while they visit health facilities for their ANC.

7.2.3 Availability of trained health professionals

Some participants from the community commented that there was a need for more ANMs and even a doctor at the BCs (Section 6.1.1.2). The issue of staff shortages was not mentioned by the ANMs, particularly those employed by the government, since most of them were permanent staff and did not have to worry about losing their jobs. However, some of the ANMs who were employed by the NGO, were worried about losing their job after their contract ended (see Section 6.1.2.1). One of the components of quality of care according to WHO Quality of Care Framework (Tunçalp et al. 2015) for maternal and neonatal health is competent and motivated human resources which were reported to be satisfactory by the women in the community. As stated above, the women in the community felt that there was a shortage of ANMs at the BCs and it would have been better if there were some doctors present at these BCs (Section 6.1.1.2). The preference for doctors compared to midwives was also noted and implies there is a mistrust among women about the capability of ANMs. The government needs to take this seriously and think about how to raise the capacity, profile and reputation of ANMs.

Staff shortages were also reported as an issue faced by the health workers working in Indian hospitals (Bhattacharyya et al. 2015). It is up to the government to think about how to

increase the number of ANMs working in these rural areas and filling the vacant positions for ANMs (Prasai 2013). Perhaps the launch of the Bachelor in Midwifery programme (Kathmandu Post 2017) could be a new milestone in increasing midwifery professionals and act as a solution to the problem of the lack of midwives, especially in rural Nepal.

7.2.4 Attitude and behaviour of ANMs

The results of the systematic review (Mahato et al. 2018b) also reported that the attitude and behaviour of service providers are amongst the most important factors that affect the quality of care provided by the health facility. In this study also, when the ANMs were interviewed about their communication with the women who came for birth services, they mentioned that every effort was made to communicate the progress of labour to the women and their family members. Along with that, emotional support was also provided to the labouring women and their family member. They also said that they allowed one family member to be present beside the maternity bed and contrasted it with the situation in hospitals where family members are normally not allowed by the side of labouring women (Section 6.1.2.1). Few ANMs mentioned that due to high patient load, they even allowed the women in early labour to return to their home and return after the labour progressed. Returning home if women are not in established labour is a common practice in country like the United Kingdom (NICE 2017), which is important since studies suggest early admission to labour is associated with high risk of CS (Mikolajczyk et al. 2016).

Women in the community were also very happy with the attitude and behaviour of ANMs at the BCs. They specifically commented that the ANMs were very helpful and provided up-to-date information about the progress of labour. In addition, women also mentioned that the ANMs were very supportive and provided emotional support during labour. One woman in

particular, was so happy and confident about the behaviour of the ANMs that she did not even feel the need to take any family members with her into the labour room, though the BCs allowed one family member to accompany the labouring women (Section 6.1.1.1). Not only did the women report that the ANMs were helpful while attending the BCs, but they also said that they were very supportive while visiting them at home. These results indicate the importance of good attitudes and behaviour by the health professionals and how it affects women's attitudes towards them and possibly their decisions about attending these health facilities in future. Women in this study mostly provided positive remarks about many aspects of care they received at BCs including attitude and behaviour of ANMs. It could be possible that patient's compliance and acquiescence in interviews as seen in this study was because of a form of response bias which is common in social groups that are relatively powerless (Ross and Mirowsky 1984; Finlay and Lyons 2002). But this could not be explored in this study and can be considered as a limitation of this research.

While assessing the quality of care using the WHO Quality of Care Framework (Tunçalp et al. 2015), from the perspective of experience of care, women in the community did feel that effective communication; respect and dignity; and emotional support were provided to them at the BCs, especially by the ANMs who were in-charge of providing the birthing services (Section 6.1.1.1).

Several studies have reported issues with the attitude and behaviour of health providers during childbirth such as receiving poor care, lack of prompt attention, delay in receiving care and support, leaving women unattended and treating them badly (MacKeith et al. 2003; Pettersson 2004; Delvaux et al. 2007; Leigh et al. 2008; Kruk et al. 2009a; Kruk et al. 2010; Kambala et al. 2011; Kumbani et al. 2013; Phiri et al. 2014). These studies showed that

disrespect and abuse from health professionals received in the form of being shouted or scolded, ill treatment, physical harm, beating, lack of respect or treated rudely and this was found to affect the quality ratings of a health facility (Larson et al. 2014). One study of maternity care conducted in secondary level facilities (which includes hospitals) in India also reported disrespectful behaviour from health workers including verbal and physical abuse, arrogant behaviour, lack of emotional support and non-sharing of information about care (Bhattacharyya et al. 2015).

However, this study reported women being treated well and receiving help and support during childbirth similar to other studies which reported similar findings, as mentioned in Section 3.3.4 (Tucker et al. 2013; Karkee et al. 2014b; Karkee et al. 2015; King et al. 2015). It is noteworthy that the studies which reported positive attitudes by health workers were mostly midwife-led BCs located either in urban or rural locations. Some systematic reviews on a midwife-led model of care have reported that women experienced positive care, including maternal satisfaction with information, advice, explanation and positive behaviour (Sandall et al. 2016). Studies have shown that the attitudes of midwives towards women in labour are an important factor in making decisions regarding their birthplace next time they are pregnant. So, it is important that health workers especially midwives, have a positive and sensitive attitude towards their clients during labour and delivery as women's negative encounters with health workers can result in long lasting damage, along with emotional trauma (Ross-Davie 2012). Not only are the midwives competent, but research has also suggested that midwives have a central role in the maintenance of women's dignity and their experience of childbirth (MirzaeeRabor et al. 2016).

7.2.5 Communication with women

Women using the services at the BCs reported that the ANMs were very helpful and supportive and that they communicated their progress of labour well (Section 6.1.1.1). Although this study did not report any issues with communication during labour and childbirth, several other studies found that lack of effective communication can act as a barrier to women attending delivery services (Maimbolwa et al. 1997; Afsana and Rashid 2001; Delvaux et al. 2007; Phiri et al. 2014; Asefa and Bekele 2015). Issues such as not getting adequate information from healthcare providers, communication intensifying during the second stage of labour, the right to information and informed consent not being protected, no or lack of information about labour progress and being absorbed with clinical aspects of childbirth can act as a hindrance to offering quality care.

7.2.6 Satisfaction with services available from birthing centres

A strong association was also seen between the intervention and satisfaction with childbirth services, and the biggest influence was observed in the 'highly satisfied' and 'somewhat satisfied' groups (see Table 24). Results from neither the adjusted multinomial regression analysis (Table 27) or the pre-intervention survey (Section 5.2.1) showed a significantly different likelihood for delivering at primary care facilities and hospitals/tertiary care facilities.

Similarly, results from the qualitative analysis showed that all the women in the community were generally happy and satisfied with the service they received at the BCs and could not comment about anything that needed to be changed or improved. Based on their experience, they also said that they would recommend their friends, neighbours and others to attend the BCs for giving birth (Section 6.1.1.1). Although studies show patients who are satisfied with

services available from health care providers are highly likely to recommend these services to their family and friends (Otani et al. 2005), recent study have shown hospitals with a high patient satisfaction rate may not receive high levels of recommendation (Cheng et al. 2003). Therefore, women recommending the services available from BCs cannot be used as the only proxy for determining satisfaction, rather further studies are needed to explore the factors that influence satisfaction of these women.

The results of unadjusted univariate regression depicted that those who were highly unsatisfied still had a higher likelihood of giving birth at both primary care facilities and hospitals/tertiary care facilities. The reason why these women who were highly dissatisfied were more likely to give birth at health facilities might be because when they attend the health facilities, they are exposed to more interventions than at home. Results of adjusted regression analysis did not show significant results. Additionally, as the interview participants in this study were generally satisfied with the available services, this might not be the sole criterion for determining their satisfaction (van Teijlingen et al. 2003). This is actually a limitation of this study because it could not specifically determine the satisfaction of mothers as women might just feel that what they are using are the best available services and reporting high levels of satisfaction is very common in maternity care (van Teijlingen et al. 2003).

7.3 Distance to health facility and availability of referral services

Distance to a health facility is a very important factor which determines the uptake of birthing facilities and other healthcare facilities. Access to quality maternal and newborn healthcare was still limited even before the 2015 earthquake despite the progress made over the last few decades (UNICEF 2015). The results of qualitative analysis showed that the

women in the community preferred their local health facility for childbirth services. The women also shared that when there was no BC in their village they had to face the inconvenience of attending health facilities as they needed to travel long distances to reach to nearest health facility (Section 6.1.1.2).

Some of the women in the community also mentioned that as these remotely located BCs lacked the facility of referral services, especially of ambulance availability, it was seen as a demotivating factor (Section 6.1.1.2). The ANMs commented that referrals were made to higher level CEmONC facilities when complications arose, but they were also dissatisfied with the problem of not being able to organise ambulance transfer to the referral hospital (Section 6.1.2.1). One of the components of WHO Quality of Care Framework for maternal and neonatal health from the perspective of provision of care is referral services. Referral services did not meet the expectations of either the health care providers or the women who used these services (Sections 6.1.1.2 and Section 6.1.2.1). There was a big loophole in the availability of referral services at the BCs.

Similar to the findings of this study, some studies also reported that a long distance acted as a hindrance to giving birth at health facilities (Kambala et al. 2011; Phiri et al. 2014; King et al. 2015). The lack of good referral services was also mentioned by a few other studies in low and middle-income countries, including one in rural Nepal (Chaturvedi et al. 2014; Austin et al. 2015; Bhattacharyya et al. 2015; Maru et al. 2016). The lack of availability of ambulances may have demotivated local women to attend BCs and they would either give birth at home or attend higher level facilities directly, in case complications arose. Most women surveyed in rural Nepal said that they believed it was safer to give birth at a health institution but still the majority of them gave birth at home (Maru et al. 2016). Among

several factors influencing quality of services provided by health institutions is timely access to them through good quality referral services (Austin et al. 2015). The fact that an alternative mode of transportation was made available by the ANMs in case of the lack of an ambulance, can be seen as positive behaviour on the part of these ANMs, whose sole aim was to save the life of mother and baby. The efforts made by these ANMs are worth applauding, but the government must think seriously about the state of and availability of referral services especially in rural and remote areas in Nepal.

7.4 Socio-economic factors

Several socio-economic factors can affect the decision to give birth at the health facilities, in this study giving birth at the BCs. Literature has shown that social and economic inequity can act as a barrier for women to give birth at health institutions (Maru et al. 2016). Financial problems, husbands' occupations, education and women's empowerment have all shown to be a contributing factor in choosing BCs for childbirth.

7.4.1 Literacy level

The education level of women and their husbands determined if they utilised the birth services at BCs. The results of the pre-intervention study showed that the literacy level of both husbands and women affected their choice of birthplace (Table 9). Contrary to the results of the pre-intervention analysis, the results of the comparative pre- and post-intervention study showed that only women's education level affected the birthplace (Table 27).

The study findings from the comparative pre- and post-intervention survey were similar to the findings of a study in Ethiopia, where women's educational level affected the birthplace, but not that of their husbands (Abeje et al. 2014); however, this contrasted to the study in

rural Nepal where the educational status of women had no effect on deciding the birthplace (Shah et al. 2015). However, two studies from Ethiopia and Bangladesh showed that the educational level of both women and their husbands affected the birthplace (Bayu et al. 2015; Kamal et al. 2015). In contrary to all these studies, one study from Nepal showed neither the women's or their husbands' educational level of affected the birthplace (Karkee et al. 2014a).

7.4.2 Husbands' occupation

The husband's occupation was also associated with birthplace as showed by the results of the pre-intervention survey. Women whose husbands were farmers were significantly less likely to give birth at hospitals/clinics compared to home/on way (Table 9). Similarly, the results of unadjusted univariate regression analysis showed women whose husbands were farmers and unskilled labourers were less likely to give birth at either primary care facilities or hospitals/tertiary care facilities (Table 26). Adjusted multinomial regression analysis showed that the husband's occupation had no effect on determining birthplace. Two studies in Ethiopia and rural Nepal found the husband's occupation had an association with the attendance of an SBA at birth (Dhakal et al. 2011; Adewemimo et al. 2014). One study in Nepal also found an association of women's occupation with health facility attendance for the birth of both teenage and non-teenage women (Acharya et al. 2017).

7.4.3 Women's autonomy

Women autonomy was seen as an important factor that determined the uptake of health facilities (the BCs). Determinants of women's autonomy, such as a decision maker for birthplace, are important factors affecting choice of birthplace. The results of both the pre-intervention survey and the comparative pre- and post-intervention survey depicted that

husbands, and women and family members were in charge of making decisions related to birthplace, as shown by the Cramer's V value and adjusted residuals as well as regression analysis (Sections 5.2.1 and 5.2.2). The regression analysis showed women had a low likelihood of making a decision for both attending primary care facilities or hospitals/tertiary care facilities whereas husbands, and women and family members had an increased likelihood of making the decision for both attending primary care facilities or hospitals/tertiary care facilities. Research has shown that although women want to choose their birthplace based on safety and other grounds (Hadjigeorgiou et al. 2012a), many women's decision to give birth at a health facility is not their own but involves their family as well as the community (Dahlberg et al. 2015). The women sometimes find that their right to choose their birthplace is compromised because of cultural and traditional practices (Hadjigeorgiou et al. 2012b). A study conducted in rural Nepal also established that the decision for uptake of the institutional birth services was influenced more by family members or family members and women and not by women alone (Shah et al. 2015). Similarly, husbands' control over decision making regarding the birthplace was shown by studies in Tanzania (Danforth et al. 2009) and Bangladesh (Story et al. 2012). Women's autonomous decision did not seem to be better than their husbands or even other family members in terms of accessing health facilities for childbirth. The results of this study imply involving women in the decisions related to their maternal healthcare including choosing the birthplace ensures that women are empowered and can exercise their rights over reproductive healthcare. Further implications of this study suggest on further focusing on educating mothers about importance of giving birth at health facilities along with educating their husbands and other family members about importance of involving women in decision making regarding their healthcare and specifically about where to give birth.

Although studies have shown that men in Nepal are increasingly entering the area of maternal health (Thapa and Niehof 2013), another study identified the important role that husbands can play in maternal health and safe childbirth, which can be done through health education (Lewis et al. 2015). According to a study in Bangladesh, it is even important that both husbands and wives agree with the decision related to antenatal care and skilled delivery care utilisation (Story and Burgard 2012). Another study from Nepal (Shah et al. 2015) suggests involving women and their family members in campaigns aimed at improving institutional birth.

7.4.4 Other factors

Besides the above three factors, other aspects such as distance to health facilities, lack of access due to poor road condition and low socio-economic status (level of poverty) does affect the choice for birthplace. Although distance to health facilities did not show significant results in both pre-intervention and comparative pre-post intervention survey, it was significant in the baseline survey analysis conducted with including seven VDCs (Section 1.9 for baseline survey). Additionally, women choosing near located BCs as shown by qualitative results also points that distance does affect the decision about where to give birth. Also, poor condition of road did affect availability of transportation and referral services as evident from the accounts of ANMs working in the BCs (Section 6.1.2.1). Similarly, socio-economic status of women as indicated by ownership of consumer durables such as owning radio and television did affect place of childbirth with women being significantly more likely to give birth at primary care facilities and hospitals/clinics in the pre-intervention survey (Table 8).

7.5 Strength and limitations of study

Limitations

This study has some limitations, especially during the selection of the study site and its respondents.

- Only one district, Nawalparasi, was selected for the study due to limitations of time and resources. However, the Nawalparasi district was chosen because it has both plain and hill elements and the population is also diverse, consisting of both hilly and Terai caste people. As only one district was selected for this study, generalisation of the study findings cannot be made about the whole country.
- Another limitation is that only three BCs were chosen for conducting interviews, although in the beginning it was planned to cover three to five BCs, considering the time limitation to conduct these interviews (Section 4.2.5.2). Two GTN supported BCs and a third government supported BC were selected for the purpose of comparison. Adding more BCs would have meant more time and resources needed to travel to these BCs.
- Although this study explored the quality of services available at BCs qualitatively as mentioned in second qualitative objective (Section 2.12.2), these could not be measured quantitatively. It was initially planned to conduct quality checks of BCs based on the availability of equipment, staff and services, but due to time constraints it could not be carried out. Future research should be focused on measuring these aspects quantitatively along with conducting qualitative interviews to explore the cause of poor utilisation of the services available at BCs.

- For the pre-intervention analysis, as the data were available in the form of secondary data, hence some of the recoding and grouping done for the analysis purpose could not be changed. For example, the group hospital/clinics in the pre-intervention analysis might have contained some private clinics along with hospitals. However, it was ensured that in the post-intervention survey, the group hospitals/tertiary care facilities did not include private clinics.
- Another limitation is that the study depended on other people's data available for secondary analysis. The VDCs chosen for sampling, sample size calculation and even the questionnaire design were done by the GTN and only the data collected after the pre-intervention survey was made available for the study. During the follow-up study (post-intervention), many choices were limited and were determined by the pre-intervention survey data to make comparison possible.
- This study could not specifically determine the level of satisfaction amongst the women users as all women expressed high levels of satisfaction, which could just be because they are not exposed to better services and might think that what they are using are the best available services, as discussed in Section 7.2.6. Also, recommending BC to family and friends can not be used as the sole criterion for measuring satisfaction among women.
- This study also could not explore if women's positive remarks about attitude and behaviour of ANMs was due to response bias, as discussed in Section 7.2.4.
- As this study aimed to focus on conducting surveys along with interviews, there was a smaller sample and fewer interviews in the qualitative method, as the attention and the resources were divided between these two methods.

Strengths

Although the study suffers from some limitations, there are several strong points of the study as discussed below:

- Using a mixed-methods approach adds to the strength of the study by providing rigour and triangulation of methods. The quantitative pre- and post-intervention survey provided the data related to maternity and childbirth services, while the qualitative interviews helped to explore the reasons for the results of the survey.
- Large sample size for survey: The sample size used for the pre-and post-intervention survey was large, which helped to increase the power of the study. Having too small a sample size may produce results that can not be extrapolated and undermine the internal and external validity of study (Faber and Fonseca 2014). This study had 420 respondents for the pre-intervention study and 699 for the post-intervention survey. This sample size would have been impossible for doctorate level primary research.
- Longitudinal repeated cross-sectional study: One of the major benefits of a longitudinal study is that it employs continuous or repeated measures and provides a more comprehensive approach to research, allowing understanding of the degree and direction of change over time (Caruana et al. 2015).
- Advantages of using mixed-methods for this research
    - This mixed-methods study makes good use of resources as part of the quantitative data generated in the survey of women with a child under the age of two was by two different evaluation studies and one study on assessment of quality of BCs. This means women will not be overburdened by researchers. The questionnaire was adapted from one used in previous

studies in Nepal (Sharma et al. 2016) with new questions added specifically on (a) maternity care and (b) BCs.

- Understanding complex issues related to maternity care from different perspectives requires combining of methods which can be achieved by the use of mixed-method research. In addition, it also provides better and more robust results because of the use of triangulation, as findings are corroborated or supported by different methods (MacKenzie et al. 2014). The use of mixed-methods in this context reduced bias and increased validity.

7.5.1 Chapter summary

This chapter discussed the key findings in the light of the research questions outlined in Section 2.10. The key findings were summarised and discussed in the light of the literature. The significance of the findings both for rural Nepal and elsewhere in low-income countries has been discussed. Here the findings are merged by discussing first the quantitative findings which is explained or refuted by qualitative results. In this chapter, the results of both quantitative and qualitative findings are brought together. This Discussion is organised under different topics followed by highlighting the strength and weaknesses of the study.

7.5.2 Meeting aims and objectives

This thesis has two qualitative objectives and two quantitative objectives. These four objectives were answered and addressed in the methods and results chapters, the details of which are shown in Table 30.

Table 30: Details of how the aims and objectives were addressed

Objectives	How was it addressed in each chapter
Objectives 1 and 2 1. To evaluate utilisation of BCs in rural community of Nawalparasi district	In methods chapter it was explained that for fulfilling this objective, quantitative surveys – pre- and post intervention survey were undertaken. The sampling, sample size, development of questionnaire and details of how surveys and analysis were conducted were mentioned.
2. To evaluate changes in perinatal care facilities available during pre and post-intervention survey	In results chapter, it was clear that the secondary analysis of pre-intervention survey mostly focused on determining factors that affected the utilisation of childbirth care facilities available at primary care facilities (including BCs) and hospitals/clinics (Objective 1). In results chapter, it was made clear that the comparative pre- and post-survey analysis evaluated the changes in perinatal care facilities (Objective 2).
Objectives 3 and 4 3. To elicit the views of community women and health care providers regarding the services available at BCs. 4. To assess quality of care of services available at BCs.	In methods chapter it was explained that for fulfilling this objective, qualitative interviews and focus group discussion were conducted. The sampling, sample size, development of interview schedule and details of how analysis were conducted were mentioned.
	In results chapter, it was explained that to fulfil these objectives, the interviews from community women and healthcare providers especially the ANMs, and also the focus group discussion were conducted. The participants expressed their views about the available perinatal services as well as the quality of care of available services.

CHAPTER 8 Conclusions

8.1 Introduction

The main conclusion of this thesis on maternity and childbirth care in Southern Nepal is that a community-based health promotion intervention has the potential to increase the proportion of births at BCs. This will help decrease home births if BC services are promoted by the local health promoters. BCs can thus play an important role in the solution to Nepal's low level of (a) institutional delivery and (b) skilled attendance at birth.

The role of health promoters and FCHVs is important in rural Nepal, since most of the women living in rural area are uneducated and lack knowledge and awareness regarding a safe environment for giving birth and the importance of giving birth at a health facility located near to them. Moreover, the socio-economic factors including women's and their husbands' education, husbands' occupation and level of women's empowerment affect the utilisation of services at the health facility (especially BCs in this study). Attending all four antenatal visits is often associated with women giving birth at health facilities (Section 5.2.1). The logic is that women who are familiar with and have visited BCs for ANCs are more likely to choose BCs for the birth.

Access in a country such as Nepal will always be a barrier due to the large rural and poor proportion of its population. Even with one BC in each VDC, not every woman will have easy access geographically. Moreover, socio-economic barriers to certain pregnant women attending BCs will remain (Simkhada et al. 2010; Rogers et al. 2015).

The qualitative analysis in this thesis found that women in the community were very happy with the quality of services provided by BCs, in particular the helpful and supportive role of the ANMs (Section 6.1.2). But this finding needs to be further explored by conducting larger

qualitative and quantitative studies with deeper understanding of the relationship between providers and women who receive the care as well as type and quality of care provided to community women. Also, larger studies are needed to further explore if women's positive remarks about attitude and behaviour of ANMs is not due to response bias as discussed in Section 7.2.4. However, BCs also lack some of the essential services that need to be available, including good and trust worthy referral services (Section 6.1.1). There is also a need for more health workers (mostly ANMs) at the BCs and a need for continuity of care and more facilities which are free of charge.

The following sections list the key conclusions from the systematic review (Section 8.2) together with those of the qualitative and quantitative studies (Section 8.3).

8.2 Key conclusion from systematic review

8.2.1 Factors affecting quality of maternity care

The systematic review showed two leading emerging factors which affected the quality of maternity care available from BEmONC and midwife led facilities: (a) 'facility level' factors and (b) 'access to care' factors. The 'facility level' factors were associated with services and provider-related aspects. However, there were not only barriers but also facilitators in this category (see Section 3.4.1). The facilitators were: satisfaction with services; emotional support during labour and childbirth; and trust in health providers. The barriers included: lack of equipment and drugs at the facility; lack of trained staff; poor attitudes and behaviour on the part of service providers and poor communication with women. These facility-level factors belong to Phase III delays (Thaddeus and Maine 1994), which directly affected provision of services at the facility and thus directly affected the quality of maternal health services.

The ‘access to care’ factors included the non-facility level aspects: socio-economic factors; physical access to the facility; maintaining privacy and confidentiality and cultural values. The factors which were involved in indirectly affecting the quality of maternal health services were the ‘access to care’ determinants which were related to Thaddeus and Maine’s Phase I delays (deciding to seek care) and Phase II delays (reaching an adequate health facility). These determinants included broad socio-cultural and environmental issues that may have affected quality of care.

8.2.2 Improving the quality of maternal health services

The systematic review also found that many studies conducted on exploring the poor quality of maternal health care focused mostly on the ‘facility level’ determinants (Thaddeus and Maine’s Phase III level delays) and there are fewer studies focusing on ‘non-facility’ or ‘access to care’ determinants (Phase I and Phase II delays). This systematic review stressed that in order to improve the quality of maternal health care available at the BEmONC and midwife-led facilities, it is important to address both the ‘facility level’ and ‘access to care’ determinants. Although the ‘facility level’ determinants seem to have most effect in influencing the quality of care of these facilities and thus their utilisation, ‘access to care’ determinants should never be neglected since they can have indirect and unseen effects on the quality of care. The results of this review, although focused on the BEmONC and midwife led facilities, suggest that these determinants of quality of care can be extrapolated to CEmONC facilities.

8.3 Key conclusion from qualitative and quantitative results

8.3.1 Increased births at primary care facilities

The quantitative results of this study showed that there was an increase in births at primary care facilities after the intervention (Section 5.2.2). Even the qualitative findings depict a similar picture, with more interviewed women giving accounts of how helpful it was to give birth at BCs, although high levels of satisfaction are common in maternity care, as discussed in Section 7.2.6. One of the main conclusions of this study is that intervention helped to increase the births at primary care facilities, especially BCs. In addition, the intervention helped to decrease home births unattended by SBAs. This can be considered as a great achievement of this community-based longitudinal study and implies that BCs located in rural areas should be supported with the necessary resources, including infrastructure, equipment, 24-hour services, trained staff and referral services along.

8.3.2 Attitude and behaviour of health professionals

As shown by the qualitative findings in Section 6.1.1, positive attitudes and behaviour on the part of health professionals (ANMs in this study) promotes increased utilisation of health facility services. Proper and timely communication with psychological and emotional support during childbirth are amongst the key factors that promote future use of health facilities. The results of this study also show that ANMs showed good attitude and behaviour towards labouring women which not only encouraged them but also had positive impression. However, it could not be determined if women's positive remarks about attitude and behaviour of ANMSs could be due to compliance and acquiescence that acted as a response bias. Further larger studies are needed to confirm this and determine if it is not due to

response bias. However, it could not be explored in this Ph.D. study and can be considered as a limitation of this research.

8.3.3 Satisfaction with childbirth services

Although satisfaction with childbirth services showed mixed results, with intervention having a strong association with satisfaction, according to the quantitative findings (see Section 5.2.2), the results of the qualitative findings show that women did not comment on things to be improved at BCs (Section 6.1.1). However, as discussed in Section 7.2.6, high levels of satisfaction are common in maternity studies; this study could not specifically determine maternal satisfaction levels. Also, recommending family and friends to use BC is not the only criteria to determine satisfaction. Thus, satisfaction among women could not be determined in this research but needs further study which specifically focuses on measuring satisfaction.

8.3.4 Health promotion intervention

The NGO supporting BCs and providing health promotion messages was helpful in increasing births at BCs. However, the qualitative findings suggest that there is a need for more motivation, awareness and counselling amongst rural women. Both women and healthcare workers thought that the health promotion meetings conducted either by FCHVs or the GTN staff was insufficient to attract all women to come to the BCs to give birth, even though they attended these facilities for ANC visits. They stated that women in the community still lacked knowledge of the importance of giving birth at the BCs and considered attending hospitals, even for normal births. The need for more motivation, awareness and counselling amongst women in these rural areas and neighbouring villages was identified. The intervention, which also included providing health promotion messages

to local women, needs to be improved or other healthcare workers such as ANMs working at the BCs could also play an important role in health promotion. Additional training focused on health promotion could also be provided to ANMs and FCHVs to enhance their role in health promotion.

8.3.5 Issues with referral services and staff shortage

This thesis identified that issues with referral services were a major obstacle for the utilisation of services available at BCs. For those women who attended BCs and needed to be referred in case of an emergency, it was difficult to find ambulances to take them to higher-level facilities. The healthcare workers blamed the government for not being able to provide good referral facilities. Due to the lack of ambulances, women might be unwilling to attend BCs and instead be more inclined to attend the tertiary-care facilities simply to avoid any risk if it should arise. It is imperative for the GoN to make ambulances available for rural areas in order to improve utilisation of services at BCs and speedy referral to higher-level facilities if required.

Similarly, the issue of staff shortage, mostly the ANMs was noted by the local community women as well as the healthcare providers who were interviewed. In addition, there was also preference for doctors and mistrust seen in ANMs which the government needs to think seriously about. Raising the capacity, profile and reputation of ANMs seems imperative.

8.3.6 Women's autonomy

The results of the quantitative analysis (Section 5.2.2) showed that women were more likely to give birth at health facilities if the decision was made by their husbands. The results also highlighted that if women were involved in the decision making along with family members, there was more chance of giving birth at health facilities. Although the role of husbands in

decision-making is greater, it is imperative to involve women in decision-making regarding where they would like to give birth. In addition, it is important to involve husbands as well as other family members in programmes aimed at educating them about importance of attending health facilities as well as need for involving women in decisions related to childbirth.

8.3.7 Optimum ANC visits

The results of both qualitative and quantitative studies showed that attending ANC services for a minimum of four times is a good predictor of women using health facilities for childbirth services. From this Ph.D. study, it is imperative that there is a greater role for ANMs at BCs and health professionals at other health institutions in providing health promotion messages to pregnant women and encouraging them to attend health facilities for ANC and childbirth services.

8.3.8 Barriers due to socio-economic factors

Factors such as the literacy level of women and their husbands as well as the husbands' occupations affected the birthplace. Women who were uneducated or less educated were less likely to attend health facilities. Husbands who were less educated were less likely to have their wives give birth at health facilities. In the same way, if the husbands of women in the study were farmers or in unskilled professions, it meant that women were less likely to attend health facilities for birth. It can thus be concluded that being less educated and being in unskilled professions affects the decision about the birthplace. Additionally, other factors such as socio-economic condition (level of poverty), lack of transportation due to poor road condition and large distance to health facilities did affect utilisation of services available especially at BCs. There is a need for further studies to explore these factors.

CHAPTER 9 Recommendations

This longitudinal repeated cross-section study explored rural maternity and childbirth care in the Nawalparasi district of Nepal and has several implications for public health. This chapter offers various recommendations for (a) policy-makers; (b) NGOs; (c) educators and trainers; (d) researchers; and (e) practitioners.

9.1 Recommendations for policy-makers

- The government has identified inadequate use of BCs and the need to increase their numbers. This thesis recommends that the GoN should expand its strategy to upgrade health facilities to BCs and run innovative programmes to encourage delivery at BCs. However, simply upgrading to BCs will not necessarily ensure high quality services, so the government should also consider providing enabling factors such as essential equipment, infrastructure, adequate funding and provision of ambulances to facilitate referrals.
- More health workers are needed; thus, the government needs to increase the cadre of ANMs working in rural areas (Section 7.1.1). Some women in community also demanded for doctors to be present at BCs owing to mistrust in ANMs. Therefore, the government should also consider raising skills, profile and reputation of ANMs.
- Employing local health promoters and strengthening the FCHVs' role in health promotion is needed to increase the level of knowledge and awareness amongst women who are otherwise unaware of the importance of giving birth at BCs and attended by SBAs (Section 7.1.2).
- The government should focus on making the ambulance services available to rurally located health facilities such as BCs, so that women can reach higher level health

facilities easily when they are referred by ANMs (Section 7.3).

- The government should also focus its attention on improving road condition in rural areas and availability of transportation facilities in these difficult to reach areas (Section 7.4.4 and 8.3.8).
- Strengthening the role of FCHVs as health promoters both financially and practically. The crucial role that FCHVs play in improving the health of all community members is known to all, but other research also shows that these FCHVs work as volunteers and are also overburdened by all the roles they are supposed to play (Section 7.1.2). The Government of Nepal needs to ensure that FCHVs are motivated, perhaps through providing incentives or reimbursements, so that they are more willing to contribute to their health promotion role.
- The government should plan how to continue services to provide better maternal and childbirth care after the NGOs stop their support and thereby help to reduce dependency on the NGOs/ donor agencies for improving maternity care, especially in remote and rural parts of the country.
- Providing health promotion related training to ANMs and FCHVs, so that they are equipped with more skills and knowledge and can motivate community women to utilise services available from local BCs rather than choosing higher-level facilities or even choosing to go to India.

9.2 Recommendations for non-governmental organisations including GTN

- Although support from NGOs is essential and helps to fill the gap in services that are not provided by the government, it is very important that NGOs support the official governmental programmes, such as GTN did in supporting BCs and employing local

health promoters, for a definite tenure.

- Motivating the FCHVs who are trained by the local health promoters to carry out their role. Due to the higher workload, the FCHVs may feel that motivating local women to utilise BC services as extra work, in addition to their usual day-to-day tasks. NGO-employed health promoters should make the FCHVs feel that training will enhance their health promotion role, which will enable them to carry out health promotion and education in the local community.

9.3 Recommendations for educators and trainers

- This study recommends running innovative programmes to encourage births at BCs, for example, by employing local health promoters who can participate in fora such as women's group meetings and organise health education classes for community members. The main aim of such education programmes should be to increase knowledge and awareness regarding giving birth at local BCs and their benefits. Specific education programmes for husbands and family members should be designed and organised.
- Providing training aimed at improving knowledge about health promotion amongst women regarding the importance of giving birth at health facilities.
- Motivating trainers to spread the message about BCs in their communities.
- Health promoters, FCHVs and ANMs should be trained in understanding the importance of community participation and formulating new and innovative ways to make health promotion effective.

9.4 Recommendations for researchers

- One of the main findings of this study was that the BCs have the potential to increase

birth at these facilities and decrease home births if local health promoters are involved in providing health education and promoting women to use the services available at BCs (Section 5.2.2). Future research needs to be focussed on how health promoters can do this and measure the effectiveness of health promotion and behavioural change strategies at a population level.

- Future research needs to measure the quality of services available at BCs using both quantitative and qualitative methods.
- Future research should also focus on measuring the impact or effectiveness of health promotion alone on increasing births at BCs.
- Future research should also focus on determining and measuring levels of satisfaction amongst women using maternity services, using a wide array of tools (Section 7.2.6).
- Larger studies are also needed to explore if women's positive remarks about attitude and behaviour of ANMs is not due to response bias (Section 7.2.4).
- Future studies are also recommended to study effects of socio-economic condition such as poverty, transportation facilities and distance to health facilities on utilisation of services from rural located BCs (Section 7.4.4).

9.5 Recommendations for practitioners

- Health promoters, FCHVs and ANMs need to motivate women and encourage them to attend the facilities at BCs. This should be done with not only women, but also include their family members, particularly husbands and mothers-in-law, as they have more decision-making power in the home (Section 7.4.3).
- ANMs should also play a role as health promoters. The government and NGOs

should make them aware of the importance of giving birth at health facilities and motivating women and their families to use services available at the rural BCs, over and above their responsibility of carrying out day-to-day work at the BCs (Section 7.1.2).

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Appendix

A. Draft of data extraction form

Study number	1		
Type of study	1= qualitative 2= survey (or cohort) 3= experimental		
Author/s			
Title			
Journal/Publication			
Year Published	Volume	Issue	Year
Year conducted			
Research Objectives	1 2		
Participants	1 2		
Outcome measured in results	1 2		
Setting			
Sample size/participants			
Sampling method			
Data collection method			
Ethics and informed consent	1 = yes 2 = not recorded		
Data analysis technique			
Findings			
Authors conclusion **Reviewers comments**			
Study limitations	Reported Not listed, but….		
Study quality as assessed by author			

B. Ethical approval letter from Bournemouth University

Bournemouth University

Research Ethics Checklist

Reference Id	8710
Status	Approved
Date Approved	05/11/2015

Researcher Details

Name	Preeti Mahato
School	Health and Social Care
Status	Postgraduate Research (PhD, MPhil, DProf, DEng)
Course	Postgraduate Research
Have you received external funding to support this research project?	No
Please list any persons or institutions that you will be conducting joint research with, both internal to BU as well as external collaborators.	Bournemouth University (Dr Catherine Angell, second supervisor), Liverpool John Moores University (Professor Padam Simkhada) Green Tara Nepal (Ram Chandra Silwal) Green Tara Trust (Dr Jane Stephen)

Project Details

Title	Addressing quality of care and equity of services available at birthing centres to improve maternal and neonatal health in western Nepal
Proposed Start Date	01/08/2015
Proposed End Date	17/12/2017
Supervisor	Edwin Van Teijlingen

Summary (including detail on background methodology, sample, outcomes, etc.)

Establishing and promoting birthing centres (BCs) is one strategy to increase access to emergency obstetric care and skilled birth attendance at birth to avert many maternal deaths. The World Health Organization (WHO) estimates the Maternal Mortality Ratio (MMR) of Nepal to be 170 per 100,000 in 2010 which substantially declined from 364 in 1996 and to 209 per 100,000 in 2006. BCs are a component of local health service delivery whereby midwives (or equivalently trained staff) provide maternity services in the community or in hospital to generally healthy women with an uncomplicated or low risk pregnancy. There is an increasing trend of bypassing BCs to deliver at hospitals. In addition factors like accessibility, socio-demographic and cultural factors acts as barriers to pregnant women attending birthing centres and facilities. With increase in facility-based births, more attention to the quality of care and its monitoring is needed. Many studies done on quality of care in maternal services were quantitative in nature and thus qualitative studies focusing on the perspective of health care providers as well as that of users who utilize these services is necessary.This PhD will adopt mixed method approach to evaluate factors affecting quality of BCs. A systematic review will be done before the field study. This review will identify barriers and facilitators to the uptake of birthing centres in low and middle income countries. The importance of combining both quantitative and qualitative data is to better understand the quality of care issue. A quantitative survey will be conducted of women of childbearing age in the fieldwork sites along with observation of birthing centres using observation checklist. Qualitative research will be conducted with a sub-sample of the women in the survey, as well as with service providers and health policy makers. Quantitative data about responsible factors as well as qualitative data of taking in account view of both mothers and health care providers will be combined. Birthing centres will be identified in Nawalparasi (in the south) and a hilly district (in the north) will be selected. Health personnel and women users will be purposively chosen for interviews and focus group discussions. Standard structured observation checklist along with structured questionnaire will be used for quantitative assessment whereas focus group discussion along with interviews will be carried out for qualitative approach. The questionnaire will be piloted on a small number of participants in Nepal prior to the thesis study. The result from this research will provide evidence on the quality of services available at birthing centres.

External Ethics Review

Does your research require external review through the NHS National Research Ethics Service (NRES) or through another external Ethics Committee?	Yes

Please ensure that the researcher obtains external ethical approval before commencing research.

C. Questionnaire for quantitative assessment of pre-intervention survey

VDC: …….. **Ward no.: ……..**
Name of village: …… **Day: ……..**
Household number/identification: …….. **Date:** 2008/01/…..

SCREENING Q: DO YOU HAVE A CHILD UNDER 2 YRS (COMPLETE)? 1. Yes 2.No (if no, do not continue questionaire) तपाइको २ बर्षसम्मको बच्चा छ? १.छ २.छैन (यदि नभएमा प्रश्न नसोध्ने)
If Yes, how old is your youngest child? ……..yrs ……months यदि भएमा सबभन्दा सानो बच्चा कति उमेरको भयो?

Section 1:_Household and Socio-demographic information

SN	Questions	Coding categories	Skip
1.1	In what month and year were you born? तपाइको जन्म कुन महिना र सालमाा भएको थियो? बि. सं. मा लेख्नुहोस् ।	Month: Don't Know month: Year: Don't Know year:	
1.2	What is your age? तपाइको उमेर कति भयो? (compare and correct 1.1 and/or 1.2 if inconsistent) प्रश्न 1.1 र 1.2 को बीचमा एकरुपता छ वा छैन हेर्नुहोस्	……Years	
1.3	What is your cast /ethnicity**?** तपाइको जात के हो?	1. Brahman 2. Chhetri 3. Tamang 4. Newar non-Dalit 5. Newar Dalit 6. Balami 7. Dalit 8. Other (specify) ……	
1.4	Are you from Dalit Caste? तपाइ दलित जातिमा पर्नुहुन्छ?	1. Yes 2. No 3. Don't Know →	No/DK go to 1.6
1.5	If yes, are you aware of extra facilities/priviledges that are available to you (eg. Reserved seat at school) यदि तपाइ दलित भए तपाइका लागि उपलब्ध सुविधा आरक्षण बारेमा जानकारी छ? (जस्तोः शिक्षामा आरक्षण)	1. Yes 2. No	
1.6	What is your religion? तपाइको धर्म के हो?	1. Buddhist 2. Hindu 3. Christian 4. Other (specify)……	
1.7	Can you read and write? तपाइ पढ्न लेख्न सक्नुहुन्छ ?	1. Yes 2. No	
1.8	Have you ever attended school? तपाइले स्कुल पढ्नुभएको छ?	1. Yes 2. No →	Go to 1.10
1.9	If yes, What is the highest grade you completed? तपाइले कति कक्षा सम्म पढ्नुभएको छ?	1. Primary education 2. Secondary education (SLC) 3. Intermediate (PCL) 4. Bachelor and above	
1.10	What is your current main occupation? तपाइको अहिलेको मुख्य पेशा के हो ?	1. House wife 2. Farmer 3. Service 4. Business 5. Others (Specify)…….	

1.11	What is your husband's level of education? तपाइको श्रीमान्ले कतिसम्म पढ्नु भएको छ?	1. Illiterate 2. Primary education 3. Secondary education (S.L.C) 4. Intermediate (PCL) 5. Bachelor and above	
1.12	What is your husband's main occupation? तपाइको श्रीमान्को मुख्य पेशा के हो ?	1. Farmer 2. Teacher 3. Business 4. Skilled labour 5. Unskilled labour 6. Others (Specify)……	
1.13	How many people live in your house? तपाइको घरमा कति जना हुनुहुन्छ ?	1. Total …… 2. Young people and adults (age 10 or above) …… 3. Children (below 10 yrs) ……	
1.14	How many rooms in your household are used for sleeping? तपाइको घरमा सुत्ने कोठा कति वटा छन्?	……rooms	
1.15 ##	Do you and/or your family have any property? तपाइको आफ्नै वा परिवारको कति सम्पत्ती छ?	1. Land in ropani- …… 2. Number of houses…. 3. Balance in cash (bank or in hand)…. 4. Yes, but do not know amount 5. Cattle (Specify) ……..… …….. ……	
1.16	Do you own any land or property? के तपाइको आफ्नै नाममा जमिन वा सम्पत्ती छ?	1. Yes 2. No 3. Don't Know	
1.17	Where are you currently living? तपाई अहिले कहाँ बसि रहनु भएको छ ?	1. In own home 2. In rented property 3. living with relative 4. Others (specify)……	
1.18	If it is your own home, What type of roof in your house? (Observation) यदि आफ्नै घर भएमा, छाना कस्तो प्रकारको छ? (अवलोकन)	1. Cemented 2. Tin 3. Tile 4. Hay 5. Others....	
1.19 ##	What is the main source of drinking water for members of your household? तपाइको घरमा खानेपानी कहाँबाट ल्याइन्छ?	1. Piped water to own home 2. Common/public piped water 3. Tube well or borehole 4. Rainwater 5. Tanker truck 6. Surface water (river/dam/ Lake/pond/stream/canal/ Irrigation canal 7. Stone tap/dhara 8. Bottled water	
1.20	Do you have your own toilet? तपाइकोमा आफ्नै चर्पी छ?	1. Yes 2. ~~No~~ →	Go to 1.23
1.21	If yes, how many people use the toilet? यदि चर्पि भएमा, कति जनाले यो प्रयोग गर्दछन्?	…… members	
1.22 ##	If Yes, What kind of toilet facility do members of your household usually use? (max 2 answers) यदि भएमा, कस्तो प्रकारको छ? (बढीमा २ वटा उत्तरहरु)	1. Flush to piped sewer system 2. Flush to septic tank 3. Flush to pit latrine	

		4. Flush to somewhere else 5. Pit latrine with slab 6. Pit latrine without slab 7. Composting toilet 8. Bucket toilet 9. No facility/bush/field	
1.23 ##	Does your household have: तपाइको घरमा निम्न सुविधाहरु छन् ?	1. YES 2.No 1. Electricity ☐ ☐ 2. Radio ☐ ☐ 3. Television ☐ ☐ 4. Mobile telephone ☐ ☐ 5. Landline telephone ☐ ☐ 6. Refrigerator ☐ ☐ 7. Computer ☐ ☐ 8. Wall clock ☐ ☐ 9. Dhiki /Janto ☐ ☐	
1.24 ##	What type of fuel does your household mainly use for cooking?(max 2 answers) तपाइको घरमा खाना पकाउन कुन इन्धन प्रयोग गर्नुहुन्छ? (बढीमा २ वटा उत्तरहरु)	1. Electricity 2. Lpg (Gas) 3. Biogas 4. Kerosene 5. Wood 6. Straw/shrubs/grass 7. Agricultural crop 8. Animal dung 9. Others (specify)…….	
1.26	Do you have access to a motorable road? (within five minutes of walk) तपाइकोमा मोटर बाटोको सुविधा छ? (५ मिनेट भित्र)	1. Yes ⟶ 2. No	Go to 1.28
1.27	If no, How long does it take to reach to moterable road? (TIME TAKEN TO REACH ROAD BY NORMAL WALKING) यदि नभएमा सडकमा पुग्न कति समय लाग्छ? (साधारण हिडाइमा)	…… Hours …… Minutes	
1.28 ##	Does any member of your household own: तपाइको परिवार सदस्यहरुको: A Bicycle /rickshaw साइकल रिक्सा A Motorcycle/scooter मोटरसाइकल स्कुटर A tempo: टेम्पो A Car/truck: कार ट्रक Other (specify) अन्य.....	1.Yes 2. N0 ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	
1.29	How many live children do you have? तपाइको कति जना बच्चा छन्?	……	
1.30	How old were you when you got married? तपाइको विवाह कति बर्षमा भएको थियो?	…….. yrs.	
1.31	How old were you when you had first pregnancy? तपाइ पहिलो पटक गर्भवती हुँदा कती बर्षकी हुनुहन्थ्यो?	……yrs	
1.32	How many times have you been pregnant? तपाइ अहिले सम्म कति पटक गर्भवती हुनुभयो?	……times	
1.33	Have you had any miscarriages/abortion/stillbirth? तपाइको बच्चा खेर गएको वा गर्भपतन भएको वा मरेको बच्चा जन्मेको छ?	1. Yes 2. No	

1.34	Is abortion legal in Nepal ? नेपालमा गर्भपतनले कानूनी मान्यता पाएको छ?	1. Yes 2. No 3. Don't know	

Section 2: Antenatal Care and seeking care – FOR ALL RESPONDANTS

Note: these questions relate to the woman's LAST pregnancy

2.12	Have you have full five dose of TT during your life time? तपाइले टि.टि. खोपको ५ मात्रा लिनुभयो?	1. Yes 2. No 3. Don't know 4. Only ……. Dose(s)	
2.1	Did you take iron/folic acid (vitamin tabs) during pregnancy? तपाइले पछिल्लो पटक गर्भवती हुँदा आइरन र भिटामिनका चक्की खानुभएको थियो?	1. Yes 2. No → 3. Don't know →	No/Don't know go to 2.5
2.2	If yes, for how long did you take them? यदि खानुभएको भए कति समय खानुभयो?	From …….Weeks to …… weeks of pregnancy For ……..weeks after delivery	
2.3 ##	Where did you get these tablets? तपाइले यि चक्की कहँबाट लिनुभयो?	1. government health services 2. NGO/Manmohan Memorial Hospital 3. private doctor or clinic 4. pharmacy 5. local health worker	
2.4	Did you/anyone in your family pay for the tablets? के तपाइले वा परिवारका सदस्यहरुले यि चक्कीलाई पैशा तिर्नुभयो?	1. Yes 2. No 3. Don't know	
2.5	Did you see anyone for antenatal care for this/most recent pregnancy? तपाइले पछिल्लो पटक गर्भवती हुँदा कसैलसँग जँच गराउनु भएको थियो?	1. Yes 2. No →	Go to 2.22
2.6 ##	If yes: Whom did you see for your last visit/checkup? यदि जँचाउनुभएको भए को सँग जँचाउनु भयो?	1. Doctor 2. Nurse 3. HA/CMA/MCHW 4. Health Worker (General) 5. Other, (specify)……	
2.7 ##	Where were the antenatal visits throughout your pregnancy? (circle all that apply) तपाइले पछिल्लो पटक गर्भवती हुँदा गर्भवती जँच कहाँ गराउनुभयो?	1. Hospital 2. PHC/ Hospital 3. HP/SHP 4. Other (specify)……	
2.8	After how many months of pregnancy did you first have your antenatal visit with above person? तपाइ गर्भवती भएको कती महिनामा पहिलो जाँच गराउनु भयो?	1. Month…… 2. Don't know	
2.9	How many antenatal visits did you have during your last pregnancy? तपाइले पछिल्लो पटक गर्भवती हुँदा जम्मा कति पटक जँचाउनु भयो?	1. No. of visit…… 2. Don't know	
2.10 ##	How did you know about ANC checkups? तपाइले गर्भवती जँच बारे कसबाट थाहापाउनु भयो ?	1. From Family members 2. From Radio/TV 3. Health workers 4. Friends/relatives 5. School/college/teacher 6. Internet 7. Others (specify)……	

2.11 ##	During antenatal visit, were any of the following done at least once during your pregnancy? गर्भवती जँचको बेलामा कम्तीमा एक पटक तलका प्रक्रियाहरु गरीयो? A. Did you have your weight checked? तौल लिइयो? B. Was your height measured? उचाइ लिइयो? C.Was your blood pressure measured? रक्तचाप जाँचियो? D. Did you give a urine sample? पिसाब जाँचियो? E. Did you give a blood sample? रगत जाँचियो? F. Did they look at in your eyes? आँखामा मेसिनले जाँचियो? G. Did check your ankles for swelling? सुन्निएको छ छैन पिडौंलामा औला गाडेर जाँचियो?	A .Yes No Don't know B. Yes No Don't know C. Yes No Don't know D. Yes No Don't know E. Yes No Don't know F. Yes No Don't know G. Yes No Don't know	
2.13	During the pregnancy were you given an injection in the arm to prevent the baby from getting tetanus? तपाइ गर्भवती हुँदा पाखुरामा धनुष्टंकार विरुद्धको खोप दिइएको थियो?	1.Yes 2.No → 3. Don't know	If no/don't know, go to Q 2.15
2.14	If yes, how many times? यदि दिएको भए, कति पटक दिइयो?	1. Once 2. Twice	
2.15	During the antenatal visit did you get any advice from health worker? गर्भवती जाँचको समयमा तपाइले स्वास्थ्यकर्मीबाटे कुनै सल्लाह पाउनुभयो?	1. Yes → 2. No 3. Don't know	If no/don't know, go to Q2.17
2.16 ##	What advice did they give? (more then one answer possible- but do not read the answers) यदि दिएको भए कुन कुन सल्लाह पाउनुभयो? (धेरै उत्तर आउन सक्ने र उत्तर नपढ्ने)	1. use skilled birth attendant 2. Danger signs or signs of complication and where to go if happens? 3. Place of delivery? 4. Breast feeding? 5. Avoid heavy work- load/rest 6. Hypothermia in new born 7. Sterile cord cutting 8. Others (specify)…… 9. No advice given	
2.17	How long did it take you to travel from your house to the place where you usually went for antenatal check-up? तपाइको घरबाट प्रायः गर्भवती जाँच गराएको स्थानमा पुग्न कति समय लाग्यो?	…… Hours …….Minutes	
2.18	How did you get there? तपाइ जाँच गराउने स्थानसम्म कसरी जानुभयो?	1. Walking हिडेर 2. Bus बसमा 3. Carried बोकाएर 4. Other (specify)……	
2.19	Who decided that you would go for your antenatal check-up? गर्भवती जाँच गराउने निर्णय कसले गर्‍यो?	1. Myself 2. Husband 3. Mother-in-low 4. Others (specify)……	
2.20 ##	How much did you have to pay (including cash and kind) for each antenatal visit? एकपटकको गर्भवती जाँचमा जज्माजम्मी कती खर्च (पैशा र अन्य वस्तु) लाग्यो?	1.Total cost Rs…… 2. Kind: Labour…….hrs 3. Kind, other (specify)……	

2.21	How satisfied are you with the antenatal care you received during pregnancy? गर्भवती जाँचबाट कत्तिको सन्तुष्ट हुनुहुन्छ?	1. Not at all छैन 2. Somewhat अलिअलि 3. Very धेरै	
2.22 ##	If you did not have any antenatal care visits, why not? यदि तपाइले गर्भवती जँच नगराउनु भएको भए, किन जाँच गराउनुभएन? (more then one answer possible)	1. No need perceived by women 2. Health worker is a man 3. Don't know about health services 4. Too far to health facility 5. No money to pay for visit 6. No time to go for visit 7. Family don't allow to go 8. No transportation 9. Other (specify) ……..	
2.23	Did you have any health problems during your most recent pregnancy? तपाइलाइ गर्भवती अवस्थामा कुनै समस्या भयो?	1. Yes → 2. No 3. Don't know	If no/don't know, skip to Q 2.27
2.24 ##	If yes, what problems did you have? यदि समस्या आएको भए के के भयो?	1. Vaginal Bleeding 2. Swelling body/ legs 3. High blood pressure 4. Dizziness 5. Abdomen pain 6. Vomiting in early pregnancy 7. Others (specify) ……..	
2.25 ##	From whom did you seek help for these problems? यि समस्या समाधानको लागि कसको सहयोग लिनुभयो?	1. Doctor 2. Nurse 3. Student nurse/medical student 4. HA/CMA/MCHW 5. VHW 6. Health Worker (General) 7. TBA 8. Traditional healer 9. Other, (specify)…… 10. No one	
2.26 ##	If you did not seek care from any one, why not? यदि सहयोग लिनु नभएको भए, किन लिनु भएन ?	1. No need perceived by woman 2. No need perceived by family 3. Not part of local tradition 4. HW not in health facility 5. HW is a man 6. Not aware of services 7. Too far to health facility 8. No money to pay for visit 9. No time to go for visit 10. The service is poor 11.Family don't allow to go 12. Other (specify)……	
2.27	What are the 3 main good things about ANC check up? गर्भवती जाँच गरेमा हुने तीन फाइदा के के होलान्?	1. …… 2. …… 3. …….. 4. Nothing good 5. Don't know	
2.28	What are the 3 bad things about ANC check up? गर्भवती जाँच गरेमा हुने तीन बेफाइदा के के होलान्?	1. …… 2. …… 3. …….. 4. Nothing Bad	

		5. Don't know	

Section 3: Delivery Care

3.1	When was your last antenatal visit before you gave birth? तपाइले गत गर्भावस्थामा बच्चा जन्मनु अघि कतिऔ महिनामा अन्तिम जाँच गराउनुभएको थियो?	……month of pregnancy Don't know	(जाँच नगराएकोलाइ नसोध्ने)
3.2 ##	Where did you deliver the baby? तपाइले बच्चा कहाँ जन्माउनुभयो?	1. Home 2. Hospital 3. PHC/Manamohan Memorial Hospital 4. HP/SHP 5. Other (specify)…….	
3.3	Who decided where to deliver your baby? बच्चा कहाँ जन्माउने बारे कसले निर्णय लियो?	1. Myself 2. Husband 3. Mother-in-law/grandmother 4. Other (specify)……	
3.4 ##	Who assisted with the birth of baby? बच्चा जन्माउन कसले मद्दत गऱ्यो?	1. Doctor 2. Nurse 3. Student nurse/ medical student 4. HA/CMA/MCHW 5. VHW 6. TBA 7. Family member/relatives 8. Health worker (general) 9. Other (specify)…… 10. No one	
3.5	Is there any local/ national financial help avail for your delivery? तपाइ सुत्केरी हुँदा कतैबाट (सरकारी वा गैरसरकारी) आर्थिक सहयोग पाउनुभयो?	1. Yes 2. No → Go to 3.8 3. Don't know	
3.6	If yes, who are they? यदि पाउनु भएको भए, कसले सहयोग गऱ्यो?	……..	
3.7	How much money did you receive? तपाइले सुत्केरी हुँदा कति रकम सहयोग स्वरुप पाउनुभयो?	……..Rs Don't know	
3.8	How much did you have to pay drugs, registration procedures, travel, food etc? तपाइलाइ सुत्केरी गराउँदा कति खर्च लाग्यो? (दर्ता औषधि, यातायात, खाना आदिमा)	Total cost……rupees	
3.9 ##	What problems, if any, occurred during the labour or delivery? Specify? तपाइलाइ प्रसवको समयमा कुनै समस्या आयो?	1. Long labour (more than 18hrs) 2. Retained placenta 3. Excessive Vaginal Bleeding 4. Convulsion/fits 5. Other (specify)…… 7. None →	If none, go to Q 3.13
3.10 ##	From whom did you seek help? तपाइले उक्त समस्या पर्दा कसको सहयोग लिनुभयो?	1. Doctor 2. Nurse 3. HA/CMA/MCHW 4. VHW 5. TBA 6. Traditional healer 7. Other(specify)…… 8. No one	

3.11	How soon did you seek help after the problem started? तपाइले समस्या परेको कति समय भित्र सहयोग लिनुभयो?	1. Immediately 2. In less than 2 hours 3. Between 3-6 hours 4. more than 6 hours	
3.12 ##	If you did not seek help anywhere, why not? यदि सहयोग लिनु नभएको भए, किन?	1. No need perceived by women 2. No need perceived by family 3. Not part of local tradition 4. HW not in health facility 5. HW is a man 6. Not aware of services 7. Too far to health facility 8. No money to pay for visit 9. No time to go for visit 10. The service is poor 11.Family don't allow to go 12. Too weak/sick to travel 13. Other (specify)	
3.13	How satisfied are you with the care received during labour and delivery? (Ask only to whom receive health services) तपाइ प्रसव सेवाबाट कत्तिको सन्तुष्ट हुनुहुन्छ? (स्वास्थ्य सेवा लिनेलाइ मात्र)	1. Not at all 2. Somewhat 3. Very 4. Not applicable	
3.14 ##	In your opinion, what are the main 3 problems with delivery care in your community? तपाइको विचारमा, तपाइको समुदायको प्रसव स्याहार सम्बन्धि तीन मुख्य समस्या के के हुन्?	1. No trained TBA 2. No transportation 3. Too far health facility 4. No health workers available 5. No money 6. Not usual practice 7.Don't know where to get help 8. Family do not perceive need 9. Family refused to access care 10. Other (specify)……	
3.15 ##	What 3 things could improve delivery care for women in your community? समुदायको प्रसव स्याहार सम्बन्धि तीन मुख्य के के कुरा सुधार गनुपर्ला?	1. Health facilities in village 2. Better trained staff in Health facility 3. More medicines 4. More staff 5. Inform women about available health services 6. Increased awareness about delivery care 7. More support from friends/family 8. Other (specify)……	

Section 4: Postnatal Care

4.1	After baby was born, did a health professional check your health? बच्चा जन्मेपछि, स्वास्थ्यकर्मीले तपाइलाइ जाँच गर्‍यो?	1. Yes 2. No → 3. Don't know	If no and don't know, skip to Q 4.5
4.2	How many days or weeks after the delivery did the first check take place? बच्चा जन्मेको कति समयपछि जँच गरियो? (जाँच नगराएकोलाइ नसोध्ने)	1. Same day 2. After 1 day 3. After 2 day 4. Between 3-7 day	

		5. Between 8- 14 day 6. More than 14 day 7. No Check (go to 4.5)	
4.3 ##	Who checked on your health at that time? कसले तपाइको स्वास्थ्य जाँच गऱ्यो?	1. Doctor 2. Nurse 3. Student nurse/ medical student 4. HA/CMA/MCHW 5. VHW 6. Health worker (general) 7. TBA 8.Traditional healer 9. Other (specify)…….	
4.4	Where did this first check take place? तपाइको यो पहिलो सुत्केरी जाँच कहाँ भएको थियो?	1. Hospital 2. PHC/ Mahanoman Mem Hosp 3. HP/SHP 4. Nursing home 5. Private clinic 6. Other (specify)……	
4.5	Did you have any health problems within the first 42 days after delivery? तपाइलाइ प्रसव भएको पहिलो ४२ दिन भित्रमा कुनै स्वास्थ्य समस्या आयो?	1. Yes 2. No (go to Q 4.9) 3. Don't know (go to Q 4.9)	
4.6 ##	If yes, What problems did you have? यदि आएको भए के के भयो?	1. Vaginal Bleeding योनिबाट रक्तश्राव 2. Fever ज्वरो आउने 3. Weakness कमजोरी हुने 4. Convulsions/fits कम्पन हुने 5. Breast infection दुध गानिने 6. Baby feeding problem 7. Low mood/depression 6.Offensive vaginal discharge योनिबाट गन्हाउने पानी बग्ने 7. Vaginal pain योनि दुख्ने 8. Faecal discharge from vagina योनिबाट दिसा आउने 9. Other (specify)…	
4.7 ##	From whom did you seek help for this problem? यि समस्या पर्दा तपाइले कसको सहयोग लिनुभयो?	1.Doctor 2. SN/ANM 3. HA/CMA 4. MCHW 5. VHW 6. TBA 7. Traditional healer 8. No one 9. Other (specify)……	
4.8 ##	If you did not seek help from anywhere, why not? यदि सहयोग लिनु नभएको भए, किन?	1. No need perceived 2. No money 3. Far distance health facility too far 4. No family support 5. Other (specify)……	

4.9 ##	In your opinion, what are 3 main reasons that women do not check their health after delivery? तपाइको विचारमा, तपाइको समुदायका महिलाहरुले सुत्केरी पछि स्वास्थ्य सेवा नलिनुको तीन मुख्य कारणहरु के के हुन्?	1.No transportation facility 2. Health facility too far 3. No health personnel in health 4. No money 5. No usual practice 6. No need perceived 7. Not allowed by family 8. Don't Know 9. Other (specify)……	
4.10 ##	In your opinion, what 3 things could help women access postnatal care more easily in your area? तपाइको विचारमा, प्रसव पछिको स्वास्थ्य सेवामा महिलाहरुलाइ प्रभाव पार्न कुन कुन मुख्य तीन कुरामा जोड दिनुपर्ला?	1. Health facility in village 2. Better trained staff in health facility 3. More medicines facility 4. More staffs in health centre 5. Inform women about available health services 6.Increase awareness on PNC 7. More support from friends/family 8. Don't Know 9. Other (specify)……	

Section 5 Neonatal care

5.1	If you had your baby at home, was a Home Delivery Kit box (safe delivery kit box) use? यदि तपाइले घरमै बच्चा जन्माउनु भएको भए, सुत्केरी सामग्रीको बट्टा प्रयोग गर्नुभयो?	1. Yes 2. No 3. Don't know	
5.2	With what was the cord-cut? साल के ले काटियो?	1.Clean blade 2. Unclean blade 3. Other (specify)…….. 4. Don't know	
5.3	How far from the baby's body was the cord cut? कति लामो नाभि छाडेर साल काट्नुभयो?	……..(no. of FINGER) अंगुल	
5.4	What was put on the cut cord? साल काटेपछि नाभिमा के राख्नुभयो?	1. Nothing 2. Antiseptic 3. Oil 4. Ghee/Butter 5. Other (specify)……	
5.5	When was first time the baby was washed? बच्चालाइ कति समय पछि नुहाइदिनु भयो?	1. Immediately after birth 2. After ……hrs 3. After ……..days 4. Don't know	
5.6	How soon was the baby wrapped up after birth? बच्चालाइ कति समय पछि न्यानो कपडाले बेर्नुभयो?	1. Immediately 2. Within one hour 3. More than one hour 4. Don't know	
5.7	Did you breast feed your baby? तपाइले आफ्नो बच्चालाई दूध चुसाउनु भयो?	1.Yes 2. No →	Go to Question 5.11
5.8	Was breast milk the first feed your baby was given? तपाइले बच्चालाइ पहिलो पटक तपाइको आफ्नै दूध खुवाउनुभयो?	1.Yes 2. No	
5.9	Did you give your baby the colostrum, the first yellow milk from the breast? तपाइको बच्चालाइ तपाइले पहिलोपल्ट आउने बाक्लो पहेँलो (विघौती) दुध खुवाउनुभयो?	1.Yes 2. No	
5.10	Did you breast feed within the first hour after birth?	1.Yes 2. No	

	तपाइको बच्चालाई जन्मेको एक घण्टा भित्रमा दूध खुवाउनुभयो?		
5.11	When did the baby have a first health check after delivery? बच्चा जन्मेको कति समयपछि पहिलो पटक स्वास्थ्य जाँच गराउनुभयो?	……Hours after delivery ------ Days after delivery	
5.12	Did the healthcare worker check your baby again in the first month after delivery? तपाइको बच्चालाइ स्वास्थ्यकर्मीले एक महिनाभित्र फेरी जाँच गर्‍यो?	1. Yes 2. No 3. Don't know	
5.13	Did your baby have any healthcare problems within the first month after delivery? तपाइको बच्चालाइ जन्मेको एक महिना भित्र कुनै स्वास्थ्य समस्या आयो?	1. Yes 2. No ----------→	(Go to Q 5.17)
5.14	At what age did the baby have health problems? तपाइको बच्चा कति दिन वा हप्ताको हुँदा स्वास्थ्य समस्या आयो?	----------days ----------weeks	
5.15	What problems occurred with the baby after delivery यदि स्वास्थ्य समस्या आएको भए के के भयो?	1. difficulty in breathing 2. cold 3. not feeding 4.too sleepy 5.Other (specify) ……	
5.16	From whom did you seek help? यि समस्या समाधानको लागि कसको सहयोग लिनुभयो ?	1.Doctor 2. SN/ANM 3. HA/CMA 4. MCHW 5. VHW 6. TBA 7. Traditional healer 8. No one 9. Other (specify)……	
5.17	Did you or anyone else register the birth of your baby? तपाइको बच्चालाइ तपाइ वा कशैले जन्म दर्ता गरायो?	1.Yes 2. No 3. Don't know	
5.18	At what age does the naming ceremony happen for your baby? तपाइको बच्चालाइ कति दिनमा न्वारन गर्नुभयो?	……..days ……weeks	

Section 6: Contraception and others

6.1	Did you use any contraceptive before your recent/last pregnancy? तपाइले अहिले वा गत गर्भावस्था भन्दा पहिले कुनै परिवार नियोजनको साधन प्रयोग गर्नुभएको थियो?	1. Yes 2. No ----------→	Go to 6.4
6.2 ##	If yes, What did you use? यदि गर्नु भएको भए के प्रयोग गर्नुभयो?	1. Oral pills 2. IUD (Copper T) 3. Injections (DEPO) 4. Implants (Norplant) 5. Condom 6. Diaphragm/cap 7. Foam/jelly 8. Other (specify)……	

6.3 ##	Where did you obtain this contraception last time? यि साधनहरु कहँबाट प्राप्त गनुभयो?	PUBLIC SECTOR 1. Gov hospital/clinic 2. PHC 3. Health post/sub health post 4. mobile clinic 5. FCHV NON GOVT (NGO) SECTOR 6. FPAN 7. Marie Stopes 8. ADRA 9. Manmohan Memorial Hospital PRIVATE SECTOR 10. private hospital/clinic 11. pharmacy 12. others (specify)……	
6.4	Was your last pregnancy planned? तपाइको गत गर्भ योजनाअनुसार भएको हो?	1. Yes 2. No	
	Have you ever discussed, with your spouse, his attitudes towards family planning?	1. Yes 2. No	
	Who makes the decisions about family planning in your family/household?	a. You b. Partner c. Mutual d. Relatives e. Health Workers f. Other (Specify)	
6.5	Were you using any kind of contraceptives when you became pregnant?	*a.* Yes → *if yes, continue* b. No → *if no,xxx*	
	What form of contraceptives were you using?	a. Pill b. IUD c. Condom d. Injectables e. Implants f. Male Sterilisation g. Female Sterilisation h. Traditional i. Emergency j. Other (Specify)	
	How long had you been using that method of contraception?	a. Less than one week b. Less than one month c. Between 1 – 6 months d. Less than one year e. More than one year	
6.6	Are you a member or ex member of any elected local body? (eg VDC, ward etc) तपाइ कुनै निर्वाचित संस्थाको सदस्य हुनुहुन्छ? वा हुनुहुन्थ्यो? (गा.वि.स., बडा)	1. Yes (your post) …….. 2. No	

6.7	Are you member of any voluntary organisation (NGO, User groups etc) तपाइ कुनै समुह वा गैरसरकारी संस्थाको सदस्य हुनुहुन्छ?	1. yes 2. No	
6.8	Who makes the decisions mainly about health care in the household? तपाइको घरमा स्वास्थ्य सेवा लिनमा कसले निर्णय गर्छ?	1. Myself 2. My husband 3. Mother in law 4. Other (specify who)……	

D. Questionnaire for quantitative assessment of post-intervention survey

SN:

VDC: ……..

Ward no.: ……

Name of village: …….

Date

SCREENING Q: DO YOU HAVE A CHILD UNDER 24 MONTHS?

1. Yes

2. No (if no, do not continue questionnaire)

Section 1: Household and Socio-demographic information

S.N	Questions	Coding categories	Remarks
1.1	In what month and year were you born? Write in B.S.	Month: …… Don't Know month Year: …… Don't Know year	
1.2	What is your age? (Write completed yrs)	……Years	
1.3	What is your ethnicity**?**	9. Yadav 10. Tharu 11. Muslim 12. Gurung 13. Other (specify.....)	

1.4	What is your caste /ethnicity**?**	1. Janjati 2. Tharu 3. Muslim 4. Terai Dalit 5. Pahadi Dalit 6. Brahmin 7. Chhetri 8. Other (specify.....)	
1.5	What is your religion?	5. Buddhist 6. Muslim Hindu 7. Christian 8. Other (specify)……	
1.6	Can you read and write?	2. Yes 3. No →	Go to 1.9
1.7	Have you ever attended school?	1. Yes 2. No →	Go to 1.9
1.8	If yes, what is the highest educational level you've completed?	5. Primary (completed class 5) 6. Secondary (completed class 10) 7. Intermediate (PCL)-completed class 12 8. Bachelor and above	
1.9	What is your current main occupation?	6. Student 7. House wife 8. Farmer 9. Service 10.Business 11.Other (Specify).....	
1.10	What is your monthly income?	1. Less than Rs 5000 2. Less than Rs 10000 3. More than Rs 10000 4. No income	
1.11	What is your husband's level of education?	1. Illiterate 2. Primary education 3. Secondary education (S.L.C) 4. Intermediate (PCL) 5. Bachelor and above	
1.12	What is your husband's main occupation?	1. Farmer 2. Teacher 3. Business 4. Skilled labour 5. Unskilled labour	

		6. Other (Specify)…..….	
1.13	How many people live in your house?	4. Total …… 5. Young People & Adults (age 10 or above) …… 6. Children (below 10 yrs) ……	
1.14	Do you have any property in your name?	1. Yes 2. No 3. Don't Know	

Section 2: Pregnancy and delivery care

S.N	Questions	Coding categories	Skip
2.1	How many times have you been pregnant in your life (including miscarriages and abortions)?	…. Times	
2.2	How many living children do you have?	…. Babies	
2.3	How old is your first and last baby?	1. ….. years/months 2. ….. years/months	

DELIVERY

2.4	Where did you deliver your last baby?	5. Home 6. Hospital 7. PHC/Health post 8. Birthing centre 9. Private clinic 10. India 11. Others…….
2.5	Who decided where to deliver your baby?	12. Myself 13. Husband 14. Mother-in-law/grandmother 15. Other (specify.....……....)
2.6	Who assisted with the birth of baby?	1. Doctor 2. Nurse 3. Student Nurse/medical student 4. HA/CMA/MCHW 5. VHW 6. TBA 7. Family member/Relatives

		8. Health worker (general) 9. Other (specify.....……..) 10. No one	
2.7	Did you receive money from government/non-government organisations as an incentive for delivering at health facility?	1. Yes 2. No 3. Don't know	For those who delivered in HF
2.8	If yes, from where did you receive?	1. Government 2. Non-government 3. Don't know	
2.9	How much money did you receive?	1. Did not get any 2. .....…… rupees 3. Don't know	
2.10	How much did you have to pay drugs, registration procedures, for staff, for delivery, travel, food etc?	1. Total cost .....rupees 2. Don't Know	
2.11	How satisfied are you with the care received during labour and delivery?	1. Highly satisfied 2. Satisfied 3. Acceptable 4. Not satisfied 5. Highly unsatisfied	

E. Questions for qualitative interview

I. Guide for semi-structured questions (Check list for interview with health care providers)

- Name of working birthing centre/Position at birthing centre.
- Years of experience at this birthing centre and past experience at any organization.
- Number of clients attending birthing centre in a month (approx), checking the records.
- Number of staff working at the birthing centre including their position and availability.
- Is the birthing centre open 24 hours?
- What happens when the ANM has to attend training in the capital or regional headquarter? Is there any alternative solution to keep the birthing centre open 24 hours?
- How is the management and funding of the birthing centre done? Is the management done by HFOMC or VDC?
- From where does the birthing centre receive its budget (Government, NGO, INGO or other)?
- Does the birthing centre has all essential drugs and equipments required for a normal birth? (Checking the drugs and equipments using observation checklist)
- If any complication arises during labour is there any referal mechanism available? (either ambulance or any transportation)
- Is there any other nearest birthing centre or health institution?

Further questions

- In your view how would you rate the quality of birthing centre in terms of services you are providing, staff, equipment, etc
- Do you provide adequate information to the labouring woman about her situation? How do you encourage her during labour and delivery?
- Do you allow family members of labouring women inside the birthing centre or do they have to wait outside?
- How do you provide the incentives that a woman who delivers at your birthing centre needs to get?
- Do all the women who come for ANC attend birthing centre for delivery? If they do not come, which facilities do they visit and what do you think hinders them to visit birthing centre and visit another facility?
- In your opinion in what way can the births occuring in the birthing centre be increased?

At the end, finish by asking

Is there anything else you need to add?

II. Guide for semi-structured questions (Check list for interview with mother or their family members)

- How far is your home from this birthing centre? Did you had any difficulty to come to this place?
- Why did you decide to come to the birthing centre for delivery?

- Where did you have your ANC check up? Did you considered to deliver at some other facilities?
- Who came with you for delivery? Were they allowed to be with you while you were in labour?
- How were you treated by the staff here? Were they kind and supportive or rude?
- Were you provided enough information about progress of your labour?
- Did you receive the service which you expected to receive at this birthing centre?
- Did you have to pay for anything or bring anything from home for delivery at this place?
- Did you receive the travel and delivery incentives which you should get from government?

Further questions

- Are you happy with the service you received here? If not, what things were you not happy about?
- What are the things that you wish to be changed/ improved at this birthing centre?
- Based on your experience would you recommend this birthing centre to your relatives or friends?

At the end, finish by asking

Is there anything else you need to add?

F. Interview Consent form

I. Participant Information Sheet

Title of project: Study of rural maternity and childbirth care in a Southern district in Nepal

Name of researchers: Preeti K Mahato, Edwin R van Teijlingen, Padam Simkhada, Catherine Angell

Participant Information

We would like to get your views and opinions about the factors you feel affects the quality and equity of delivery services at the birthing centres you visit/are working at. Knowing your views regarding the service quality you offer/are offered at the birthing centre can help us determine gaps or strengths of the birthing centres operating in the rural parts of Nepal, thus providing useful information for the improvement of services provided and how its utilisation could be improved by the rural population of Nepal. Mothers or family members who attend the delivery services and health care providers working at birthing centres will be involved in interviews (structured and semi-structured) and focus group discussion. In addition evaluation of birthing centres will also be done using an observation checklist. If you choose to take part in the study, your views and perspectives on possible factors affecting quality and equity of services at birthing centres would be explored. Your participation remains completely voluntary.

If you need any information about this study in detail please contact me using this contact detail

pmahato@bournemouth.ac.uk or (+447591147544)

II. Consent form

Title of project: Study of rural maternity and childbirth care in a Southern district in Nepal

Name of researchers: Preeti K Mahato, Edwin R van Teijlingen, Padam Simkhada, Catherine Angell

Interview and Focus Group Discussion Consent Form

We would like to get your views and opinions about the factors you feel affects the quality and equity of delivery services at the birthing centres you visit/are working at. Information provided by you will be helpful in determining gaps or strengths of the birthing centres operating in rural parts of Nepal thus providing useful information for the improvement of services provision and its utilisation by people living in rural Nepal. We want to be sure that you have understood the purpose of the research and your responsibilities before you decide if you want to participate in the study. If you

have questions, you should ask questions about this study before you decide to participate. You can ask us to explain any words or information that you may not understand.

Your participation in the research is voluntary and the information you provide will only be used for this research. If you don't wish to participate you can withdraw from the study at any time without any fear. We will protect information collected about you and your taking part in this study to the best of our ability. We will not use your name in any reports, conference paper or meetings. Once agreed to take part we will ask you (mothers) questions in structured questionnaire which could take 20-30 minutes. The health care providers do not need to fill up this set of questionnaire. Purposively selected mothers and health care providers will also be interviewed using semi-structured interview guide and/or will be asked to take part in focus group discussion. Your answers will be recorded in the digital audio recorder and it will be erased after the completion of work. You do not have to respond any questions that you do not want to respond. However, your honest responds to these questions will help us to better understand the state of birthing centres in Nepal. We would greatly appreciate your taking part in this interview. The interviews could last for 30-40 minutes and focus group discussion could take longer up to an hour.

I have read and understood above statement and I agree to take part in this study.

Initial……

Signature ……..

G. Tables from comparative pre- and post-intervention survey analysis

G.1. Table ANC, PNC and abortion related knowledge and practice among women

Characteristics	Pre-intervention (N, %)	Post-intervention (N, %)
Procedures conducted during ANC	420	699
Weight checked	337	632
Height measured	82	137
Blood pressure measured	297	573
Urine sample taken	167	509
Blood sample taken	137	490
Ankles swelling checked	83	161
Iron/folic acid taken	420	699
Yes	366 (87.4)	676, (96.7)
Two doses of TT vaccine taken	375	699
Yes	353 (94.1)	685 (98.0)
PNC visit after childbirth	416	699
Yes	162 (38.9)	295 (42.2)
No	246 (59.1)	404 (57.8)
Problem within first 42 days after childbirth	417	699
Yes	80 (19.2)	148 (21.2)
No	334 (80.1)	499 (71.4)
Don't know	3 (0.7)	52 (7.4)
Knowledge if abortion is legal in Nepal	411	699
Yes	43 (10.5)	138 (19.7)
No	91 (22.1)	199 (28.5)
Don't know	277 (67.4)	362 (51.8)

G2. Practice related to childbirth

Characteristics	Pre-intervention (N, %)	Post-intervention (N,%)
Money received for childbirth	414	699
Yes	105 (25.4)	370 (52.9)
No	308 (73.3)	323 (46.2)
Money paid during childbirth	420	699
Yes	342 (79.5)	437 (62.5)
No	8 (1.9)	27 (3.9)
Don't know	78 (18.6)	235 (33.6)
Satisfaction with services received		699
Highly satisfied	296 (70.5)	678 (97.0)
Somewhat satisfied	108 (25.7)	13 (1.9)
Highly unsatisfied	16 (3.8)	8 (1.1)

G.3 Practice related to newborn care

Characteristics	Pre-intervention (N, %)	Post-intervention (N, %)
Time when baby was first washed	416	699
Immediately	136 (32.7)	125 (17.9)
Within 24 hours	154 (37.1)	79 (11.3)
After 24 hours	126 (30.2)	495 (70.8)
Time when baby was wrapped	415	699
Immediately	403 (97.1)	667 (95.4)
Within one hour	4 (1.0)	29 (4.1)
More than one hour	4 (1.0)	1 (0.1)
Don't know	4 (1.0)	2 (0.3)
Fed breastmilk first time	410	699
Yes	369 (90.0)	685 (98.0)
Age of baby when he/she was fed with any other food except breastmilk	418	699
1 month	5 (1.2)	3 (0.4)
2-4 months	10 (2.4)	7 (1.0)
5-6 months	63 (15.1)	407 (58.2)
Over 7 months	115 (27.5)	103 (14.7)
Still breastfeeding	225 (53.8)	179 (25.6)
Health checkup of baby	389	699
Within 24 hours	35 (9.0)	455 (65.1)
Within 30 days	84 (21.6)	239 (34.2)
Had none	270 (69.4)	5 (0.7)
Checkup of baby second time in the first month of birth	405	699
Yes	87 (21.5)	191 (27.3)
No	307 (75.8)	459 (65.7)
Don't know	11 (2.7)	49 (7.0)

G.4 Women empowerment

Characteristics	Pre-intervention (N, %)	Post-intervention (N,%)
Person to decide about healthcare	405	699
Myself	22 (5.4)	34 (4.9)
Husband	191 (47.2)	157 (22.5)
Myself and family members	0 (0.0)	325 (46.5)
In-laws	186 (45.9)	178 (25.5)
Others	6 (1.4)	5 (0.7)
Person who selected husband	403	699
Myself	35 (8.7)	52 (7.4)
My family	346 (85.9)	597 (85.4)
Myself and family members	18 (4.5)	49 (7.0)
Others	4 (1.0)	1 (0.1)
Who should have right to select husband/partner	401	699
Myself	86 (21.4)	64 (9.2)
Family members	391 (75.1)	566 (81.0)
Relatives	0 (0.0)	1 (0.1)
Jointly	14 (3.5)	68 (9.7)
Others	0 (0.0)	0 (0.0)

H. Nepal Health Research Council ethical approval letter

Government of Nepal

Nepal Health Research Council (NHRC)

Estd. 1991

Ref. No.: 1236

04 February 2016

Mr. Ram Chandra Silwal
Principal Investigator
Green Tara Nepal
Kathmandu

Ref: **Approval of Research Proposal** entitled **A study of maternity services and maternal health in Nawalparasi**

Dear Mr. Silwal,

It is my pleasure to inform you that the above-mentioned proposal submitted on 14 December 2015 (**Reg.no. 339/2015** please use this Reg. No. during further correspondence) has been approved by NHRC Ethical Review Board on 03 February 2016.

As per NHRC rules and regulations, the investigator has to strictly follow the protocol stipulated in the proposal. Any change in objective(s), problem statement, research question or hypothesis, methodology, implementation procedure, data management and budget that may be necessary in course of the implementation of the research proposal can only be made so and implemented after prior approval from this council. Thus, it is compulsory to submit the detail of such changes intended or desired with justification prior to actual change in the protocol.

If the researcher requires transfer of the bio samples to other countries, the investigator should apply to the NHRC for the permission.

Further, the researchers are directed to strictly abide by the National Ethical Guidelines published by NHRC during the implementation of their research proposal and submit progress report and full or summary report upon completion.

As per your research proposal, the total research amount is **US$ 3,460.00** and accordingly the processing fee amount to **NRs. 10,717.00.** It is acknowledged that the above-mentioned processing fee has been received at NHRC.

If you have any questions, please contact the Ethical Review M & E section of NHRC.

Thanking you,

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Dr. Khem Bahadur Karki
Member-Secretary

I. Published papers

I.1 Birthing centre infrastructure in Nepal post 2015 earthquake

I.2 Birthing Centres in Nepal: Recent Developments, Obstacles and Opportunities

I.3 Determinants of quality of care and access to Basic Emergency Obstetric and Neonatal Care Facilities and midwife-led facilities in low and middle-income countries: A Systematic Review

I.4 Factors related to choice of place of birth in a district in Nepal

I.5 Health Promotion opportunities for Auxiliary Nurse Midwives in Nepal

I.6 Qualitative evaluation of mental health training of auxiliary nurse midwives in rural Nepal

I.7 Using Mixed-methods Research in Health and Education in Nepal